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A THEORY OF MONADS

OUTLINES OF THE PHILOSOPHY OF THE PRINCIPLE OF RELATIVITY

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PREFACE

In this book I have brought together studies which have occupied me for many years, and have tried to impress on them the directive force of my general philosophy of life. They do not pretend to the completeness of system, they are not meant to suggest that a final solution of the philosophical problem is to be attained along any definite speculative line, they are not even my voyage of discovery, they are my exploration of the great problem of existence. Yet while I am conscious that I may have raised more problems than I have elucidated, with regard to one problem at least, I think I may claim to have made an advance. For many years it seemed to me that philosophy was paralysed by the inability to offer any escape from the solipsistic dilemma, and in the theory of the monads this difficulty has always seemed to assume its most intractable form. The argument which I have developed in my second chapter and illustrated in my tenth, may not appeal with the same force to every one, but it is the argument which satisfies me on this point.

Each chapter has an individual theme and may be read by itself. Yet the themes are not strung together as beads on a thread. They present, at least in their author's mind, a definite order in the development of the philosophical problem, and they are all inspired by the motive of evolving a theory consistent with the principles of the new science.

Chapters VI., VII. and VIII. contain the substance of

three Presidential Addresses to the Aristotelian Society in the sessions of 1915, 1916 and 1917. Chapter I. was also communicated to the Aristotelian Society and published in *Proceedings*, Vol. XIX., under the title "Philosophy as Monadology."

I have not burdened the text with footnotes, and much indebtedness is passed without acknowledgment. The leaders who have influenced me most are first of all, Bergson, to whom I owe the distinct orientation of my philosophy. Croce's aesthetic theory came as a revelation to me. To Gentile I owe the full concept of the immanence of the ideal in every form of the actuality of experience. But it is to friends past and present of the Aristotelian Society that I owe the interest in philosophy which has sustained me throughout my life.

H. W. C.

LONDON, *March* 1922.

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INTRODUCTION

THE MODERN SCIENTIFIC REVOLUTION

We are accustomed to distinguish between science and philosophy. The main ground of the distinction is that experience, when we study it systematically, presents to us two distinct aspects, one subjective and the other objective. Science deals with Nature, the objective aspect of the world when it confronts the mind as external existence. Philosophy deals with Mind, the subjective aspect which experience presents when we have regard to the fact that external existence itself is primarily and fundamentally apprehended as idea. The two aspects of reality, the aspect of existence which it presents to science, the aspect of idea which it presents to philosophy, are not reciprocally exclusive, and cannot exist harmoniously in independence, for each in its very definition is universal in the absolute meaning of the term, and each, therefore, is inclusive of the other. Hence the initial difficulty of the problem of their relation, a problem which since the development and triumphant advance of scientific knowledge in the nineteenth century has come more and more to be the main and crucial problem of philosophy.

Every relation implies an identity underlying the manifest difference in the terms; but in the case of the two aspects which reality presents to our mind, the scientific and the philosophic, there seems no possibility of reconciling the difference in an identity. We seem in fact to have, not a relation, but two alternatives, the adoption of either, philosophy or science, involving the rejection of the other. For, in so far as science is knowledge, it must fall

within the knowing which philosophy regards as experience, but in so far as science presupposes the existence of its object, its reality must assume a form which is inaccessible to philosophy, and philosophy itself to be justified as science must fall within existence and cease to be philosophy. And this gives rise to a curious dilemma. The one horn is that reality, or existence, supposed independent of knowledge is in its independence, not merely unknown but by its definition unknowable; and to be unknowable and to be non-existent are, so far as our thinking is concerned, one and the same. The other horn is that the essence of science is discovery, and if there be no existence completely independent of the knowledge of it, there is nothing to discover.

Science has never been seriously troubled with this dilemma. Indeed, the very fact that philosophy has been so largely engrossed with it has always been to science the reproach of philosophy, marking it as an abstract, speculative, jejune, logistic, inquiry, remote from the concrete, practical, urgent, interests of human life. For itself, science simply sweeps the difficulty aside, cuts the Gordian knot, by the simple rough-and-ready device of assuming the existence of the object it is required to presuppose; assuming, that is, the entire independence of the object in its existence of the act by which it is known. But having done so science cannot stop. The need for a theory of knowledge is imperative, because knowledge itself is fact. It is obliged, therefore, to go on and assume that knowing is not anything, that it is no more than the simple *de facto* relation of togetherness, in which one thing, a mind, in consequence of a peculiar quality it possesses, can, without affecting in any way the thing which confronts it, contemplate that thing and thereby know it without its knowing contributing anything to the constitution of the thing known. In this way science has come to adopt as its method the study of the material universe in complete abstraction from the conditions of knowledge, and has set before itself as its ideal the attainment of a systematic body of truth about the universe, devoid altogether of any taint of subjectivity or relativity.

Science has certainly seemed to be justified by success. Indeed it is difficult even to imagine that its great advance in modern times could have been achieved had it chosen any other method. That it should be untrammelled by irrelevance was a condition of development. It is by narrowing inquiry, by concentrating observation, by excluding larger issues, by dividing and subdividing that it has conquered. But there is a limit, and the very advance of science, by its own method, and on its chosen conditions, has brought it face to face with the philosophical problem it set out by ignoring. It finds itself after a century of continuous triumphant progress arrested, not by the clamour of philosophers, but by the empirical discoveries of its own researchers, and forced to revise its apparently workable hypothesis that knowing is not anything. If science is discovery it must at least be of some consequence to know who or what it is that discovers and what are the conditions of discovery. A revolution once started has a way of gathering momentum and goes on completing itself. And to-day science from its old attitude of regarding knowing as not anything is fast coming to regard it as everything.

The revolution has come with dramatic suddenness, but like all revolutions it has been long preparing. Its fall of the Bastille was the verification of Einstein's calculation of the shift of the stars, observed during the total eclipse of May 29, 1919. This proved that the path of the light rays is curved in a gravitational field, and rendered meaningless the hypothesis of homoloidal space. But though the revolution has been sudden the scientific world was ripe for it. For many years and in many directions the old bedrock materialism, on which science had hitherto builded, was seen to be cracking and crumbling. Along several lines the sciences have been steadily converging on the necessity of a complete revision of their fundamental principle.

First, there stands the doctrine of Berkeley. More and more as science has advanced it has become obvious to scientific thinkers that this doctrine cannot be ignored but

must be reckoned with. It is easy enough to make a definite and clear distinction between the concepts of scientific reality and the percepts of sensible experience, but is it not evident that these percepts of the senses are the immediate objects of knowledge? How then do we pass from these subjective sensible qualities to the objective concepts of the scientific reality? What is the relation between the one and the other? When we have systematically worked out our concept of the scientific reality with its unsensed mathematical properties can we say that it is full reality, and that the colours, sounds, tastes, smells, feelings, which make up our experience of reality, are not anything,—a shadow world of mere illusion? We must admit that they are something, but if they are something may they not, must they not, be everything? This problem of the status of sensations and their exact position in the scheme of physical reality has particularly engaged the physicists. They by their truly magnificent generalizations enable us to form images of physical reality which represent a universe absolutely indifferent to consciousness; a world, for example, in which light, electricity, magnetism, and the rest are independent completely of the colour, sound, feeling by which they are known, and which would be what they are even were there no consciousness and, therefore, no sensible quality to be experienced. But then these sensations and the sensible qualities of which they are the experience are *de facto* existence. What place and what role is to be assigned to them in physical theory? One character of them is that of being subjective responses to objective stimuli, but that does not prevent them being objective in the full scientific meaning. As they could not be accommodated in the general materialistic or naturalistic conceptions of physics, it was supposed that they could be side-tracked, and for this purpose the physicists had recourse to the philosophers. Sensations, and, generally, the sensible qualities which they imply, were declared to be epiphenomena,—a euphonious way of saying they are nothing; or they were recognized as existent facts but declared to belong to an independent and parallel series having no

relations of interaction with the physical series. This makeshift theory could not work, but it seemed to serve a purpose, and at least to enable science to guard the pure objectivity of its subject-matter. It broke down completely when science recognized the failure of all attempts to determine the movement of a system by observations within the system. This brought out with sudden clearness that the activity of the observer is an essential determinant factor of the nature of the physical fact itself. The principle of relativity is the abandonment of the attempt in science to dissociate act and fact.

A second line along which science, following its own method and holding fast to its distinctively objective principle, has found its own progress bring it into conflict with its own principle, is in the scientific concept of life. The biological sciences arose under a kind of rational protest against the superstitious idea that life is a mystery,—the tree of life planted by God in Eden,—something linking us with the supernatural and the divine, which it is impious to investigate scientifically. The rapid success of biology seemed at first to be wholly due to the application of the mechanistic concepts of physics. So much so that a few years ago all biologists believed we might be on the point of demonstrating the complete success of the scientific method by the synthetic production of living matter in a chemical laboratory. The outstanding feature of the scientific attainment of the nineteenth century is the Darwinian theory of evolution by natural selection, that is, by a selection conceived purely naturalistically as a survival of the fittest. But without any relapse into finalistic and teleological categories, hateful to the scientific spirit, the progress of biological science, following its own line of investigation, has suggested, —and brought increasing certainty to the suggestion,—that the intellect is itself a product of evolution. The study of instinctive action, and of purposive action generally, tends increasingly to confirm it. But if intellect is a product of evolution the whole mechanistic concept of the nature and origin of life is absurd, and the principle which science has adopted must clearly be revised. We have only to state it to see

the self-contradiction. How can the intellect, a mode of apprehending reality, be itself an evolution of something which only exists as an abstraction of that mode of apprehending, which is the intellect? If intellect is an evolution of life, then the concept of the life which can evolve intellect as a particular mode of apprehending reality must be the concept of a more concrete activity than that of any abstract mechanical movement which the intellect can present to itself by analysing its apprehended content. And yet further, if the intellect be a product of the evolution of life, it is not absolute but relative to the activity of the life which has evolved it; how then, in such case, can science exclude the subjective aspect of the knowing and build on the objective presentation as an absolute? Clearly the biological sciences necessitate a reconsideration of the scientific principle.

A third line is that of the criticism of the foundation of the mathematical sciences. If not more important than the other lines it has certainly been more decisive. It has led to the formulation of the general principle of relativity, and this has involved a complete revolution in our notions of the structure of the universe and necessitated the entire re-formation of our concepts of space, time and matter. Scepticism in regard to the postulates of the mathematical sciences has been until quite recent times purely theoretical, never seeming even to threaten to justify itself in any practical application. Indeed it has seemed eminently the occupation of highly speculative minds, detached completely from any practical interests, or else the attraction of writers of romance attempting to rationalize the creations of a fertile imagination. Those, for example, who in the past have speculated on the possibility of a fourth dimension of space, or of a reversal of the order of temporal succession, have been moved to it either by their interest in theories of personal survival or purely spiritual existence, and their satisfaction in the result of such speculations has been due rather to comfort in the suggestion of possibilities, than to attainment in the discovery, or hope of discovery, of fact. But meanwhile a steady progress of purely scientific investi-

gation has led to a new cosmogony and a new theogony based on a new metaphysic of physical reality. Let us indicate briefly the lines of this development.

First, we may notice the entirely modern research which has led to the mathematical theory of continuity. Mathematics is the typical exact science, conceived by us as essentially true without depending in any manner on subjective opinion. Yet at its very basis it is challenged to justify its affirmation of the reality of the continuum on which its propositions depend and in regard to which alone its propositions have meaning and are true. What is the relation between the physical continuum which is based on our perceptions of reality and the mathematical continuum of which there are no perceptions but which we construct conceptually from the implications of sensible perception? In its origin the mathematical continuum is the attempt to rationalize a common contradictory experience. A certain sense-given particular A (a shade of colour, a musical note, a feeling of push or resistance) is indistinguishable from a numerically different particular B, and B in like manner is indistinguishable from C, yet A is distinguishable from C. For example, a shade of green in a colour scale may be indistinguishable by perception from the shade below and the shade above, while yet the difference of these two is clearly perceptible. To harmonize this discrepancy and reconcile it with the logical principle of contradiction, we suppose that behind the physical continuum which we perceive there is a real or mathematical continuum of which the physical continuum is only an imperfect apprehension, and we seem to find abundant proof of this in experience itself in the instruments devised to increase the discerning powers of the sense-organs. It is the triumph of modern mathematics to have shown the mode in which the mind constructs this continuum. It consists not of atoms or electrons or ether, but of points, lines, planes, and it has become conceptual space, the subject-matter of the science of geometry. The infinite divisibility of the mathematical continuum, which has been from ancient times the fruitful origin of antinomies of

reason, is shown in the modern theory to be involved in the construction of a concept.

More striking still has been the result of the criticism of the postulates of geometry. From ancient times Euclid's postulate of parallelism has seemed to invite demonstration and at the same time to defeat all attempts to demonstrate it. It is impossible to state that postulate in terms which carry the conviction of self-evidence. To-day we have in the non-Euclidean geometries the definite demonstration that it is indemonstrable. No contradictory results whatever follow from rejecting the postulate or from postulating the direct opposite of it. The result of this has been a complete reversal of the status once assigned to Euclidean geometry. From seeming to be the only possible science of space, the space-system of the Euclidean geometry is now a limit. In the theory of relativity it is the geometry of a point-instant infinitely remote from gravitational fields, that is, the geometry of a space-system when the distance from a gravitational centre is infinite. In other words, Euclid's Elements are not dethroned or rejected as untrue, but applicable in their absolute character (and this alone is the concern of mathematics) in an ideal region.

What the criticism of the mathematical postulates has changed profoundly, therefore, is not our science of geometry but our concept of the space which is the subject-matter of that science. Instead of absolute space, arrived at by what we have hitherto regarded as a kind of instinctive reasoning, and then set up as a necessary concept of the framework of nature, we have now an infinite series of space-systems, with the ideal space of the Euclidean geometry as a limit. And even these space-systems are not concrete reality, they are abstractions whenever they are taken apart from the time dimension. For concrete Nature is not matter but movement, and concrete Mind is not contemplation but activity. It is no longer true, if it once seemed to be true, that the mathematical, physical and natural sciences depend on the realistic hypothesis in philosophy. The assumption of material existence as a presupposition of the activity of mind in knowing and acting, even as a

purely methodological postulate, is unworkable in science. This is the real meaning of the new Copernican revolution in science which is named the principle of relativity.

Knowledge is the expression of the deep-seated need of the mind for unity. The intellect is an unceasing activity of judgment. Whatever the intellect apprehends it relates, and it apprehends by relating. The mode of its activity is externalization. Its objective, therefore, appears always as the multiplicity rather than as the unity of its object, and the unification implied in the systematic order it imposes seems an external unification, something to which objects submit in virtue of their own intrinsic nature. But the only unity which can effectively satisfy is a unity which includes the subject of knowledge. Science based on a dualistic assumption is foredoomed to failure directly it attempts to rationalize its attainment. As matter of fact, the history of philosophy shows us that the invariable result of such an initial assumption is that ceaseless attempts follow to reduce one of the two terms to nullity. This is the meaning of the controversy between realism and idealism, each strong in its affirmation of what the other denies. The keynote of modern idealism and its strength is the affirmation that reality is concrete. It rejects the abstract only in so far as it is set up as concrete in its abstractness. It rejects the presupposition of an object independent in its existence of the subject for which it is object, not on the ground of logical inconsistency, not on the basis of a metaphysical ontology which identifies *esse* and *percipi*, but purely on the ground of its abstractness. Idealism rejects equally the presupposition of a subject independent, in its existence, of the object, God independent of nature, minds independent of things. In this there is no conflict with physical science, because for science the subject of knowledge is a pure abstraction. Science hitherto, in claiming concreteness for its object, has imagined a pure object free from all subjectivity. Modern science is now coming into line with modern philosophy in the recognition that *actual* experience alone is concrete. This is what is meant by the idealistic interpretation of the principle of relativity,

—not that scientific reality has no other basis than the ideas in the minds of subjects of experience, but that it is based on an objectivity which derives its whole meaning from the concrete experience of the subject. Science no longer asks us to assume that there are abstract things-in-themselves contemplated by pure intelligences.

A very striking analogy to the modern scientific revolution is presented to us in the development of the Cartesian philosophy of the seventeenth century. That philosophy began with the distinction of two substances, thought and extension, the one corresponding to what we think of as pure contemplative intellect, the other to the independent object of contemplation, Nature. This philosophy arose when physics was differentiating itself from mathematics, following Galileo, and relying more and more on the experimental method. The philosophy of Descartes seemed to provide the very mechanistic basis of which science stood in need, the conception of a purely independent objective universe whose inmost constitution could be mechanistically explained. As a philosophy, however, we see it striving throughout its development, and continually failing, and finally completely failing, to discover any intelligible principle on which to establish the relation between the two substances which is presupposed in the concept of them. The dualism which science seemed so imperatively to demand proved unworkable. The way of escape was offered by Leibniz, but it involved a reform of the concept of substance itself. In place of the concept of substance as the substratum of two systems or orders of movement, one inert and mechanical, the other contemplative and volitional, Leibniz formulated the concept of substance as essentially active and dynamic. Reality was constituted, he said, of simple substances, but these were the monads, active subjects of experience each having the universe mirrored in its acting centre. These monads were not conceived as independent minds dotted about in an alien matter, in an independent universe, which they behold in their own manner and make the best of ; they were conceived as centres of activity, an activity consisting in the perceptions of which the objective

world or nature consists. When we make allowance for all the differences in the outlook of the seventeenth century in science, philosophy and religion, do we not see that the essence of this reform of the concept of reality is to substitute concrete experience for the independent abstractions, mind and matter?

When we turn to the new conception which is presented to us in the four-dimensional continuum of Minkowski and the finite yet unbounded universe of Einstein, do we not find that the basis of this conception is precisely the same, namely, the rejection of abstractions such as absolute space and time, and pure contemplative intellect, and the substitution of actual concrete experience? To see that this is so we have only to look behind the brilliant mathematical devices which form the scaffolding of the new scientific structure, and fix our attention on the leading motive and method, and we see at once that the strength and security of its foundation lies in its conception of scientific reality as consisting wholly in individual experience and not, in any degree or in any respect, on presupposed conditions of the experience.

Take, for example, the new discovery of the constant velocity of light: the constancy of this calculated velocity depends simply on the experience,—not on a presupposition of experience,—that we have no more rapid way of communicating than light signals afford. If we had, or should ever come to have, then the constancy of this velocity would cease to be fact. But this is a minor point and a detail. Let us come to the main conception itself. In the universe, as Minkowski and Einstein require us to conceive it, there is no simultaneity. This does not mean that we have to calculate the simultaneity of events on a new principle, it means that simultaneity in the old sense has lost its significance and in fact represents nothing; no two events are simultaneous in any universal meaning. Also there is no universal system of geometry, nothing which even corresponds to the Euclidean geometry in the old conception. Every point-event has its own geometrical system. Instead of Euclidean geometry we are given the

concept of infinite geometrical systems of which the Euclidean may be a limiting case. Now when we look behind these facts to the concept of reality on which they rest, we are able to see at once that their whole ground and rationality lie in the conception of scientific reality as constituted wholly of concrete experience. Every point-event in this universe whose track forms a world-line has to be taken primarily from its own standpoint, according to which it is the centre of the universe and its world-line the norm of direction, and all other events and world-lines are co-ordinated by it on a principle which maintains its standard. At no point in this universe and under no aspect of it can we dissolve the experience into factors and say here we have pure nature and here we have pure mind.

In what follows I have endeavoured to outline the philosophy of this concept of a scientific reality based on pure concrete experience without presuppositions.

PART I

METAPHYSICAL:
THE NATURE OF THE MONAD

CHAPTER I

THE WINDOWLESS MONAD

The Monads have no windows by which anything can enter or pass out.—LEIBNIZ.

"The world is my idea,"—this is a truth which holds good for everything that lives and knows.—SCHOPENHAUER.

PHILOSOPHY is science but not one of the sciences. It is the search for truth, but not for particular truths, nor for truth about particular facts. It is the attempt to know and to set forth in systematic order full concrete reality. It is, to speak figuratively, the mind's adventure or voyage of discovery on the ocean of its own existence, an adventure the purpose of which is to discover the full range of its activity, to know itself.

There are two ways in which we may regard the mind. We may, and we commonly do, regard it as belonging to a class among the classes of things of which the universe is composed, as an existence within the universe. We distinguish mental things from physical things, and we make the mental things the subject of special sciences. For example, we have special sciences of anthropology, sociology, criminology, ethnology, and innumerable others, all of which treat the mind as a definite thing or as the definite quality of definite things; and also we have special sciences, like the physical and mathematical sciences,—geometry, astronomy, geology, chemistry, mineralogy, and the like,—all of which treat their objects as entirely independent of any relation to the mind. Philosophy is not the science of mind when mind is regarded as a particular kind or class of existent objects.

We may also regard the mind in another way. It is for each conscious experient the active centre of a universe, a centre which is not independent of the universe, nor one of the constituents of the universe, but a focal point within it. In this way of regarding mind our whole universe comes within it, for our mind consists of our knowledge, and our knowledge is the universe, mirrored, as it were, in that active centre. When mind is regarded in this way it is the subject-matter of philosophy.

If philosophy on its theoretical side is science, on its practical side it is wisdom. When we account a man wise, we mean something more than and something different from what we mean when we say that he is learned or skilful; we mean that however extensive or intensive his special knowledge may be, he is able to grasp or comprehend life in its aspect as a whole. Plato tells us in the *Apology* that the Delphic oracle had pronounced Socrates the wisest of the Greeks, and that on being informed of the oracle Socrates wondered what could be the meaning of the god, and in order to discover it questioned all those who professed to have knowledge, but only to meet everywhere with disappointment. He concluded that the oracle spoke truly, but that his wisdom only consisted in his making no pretension to knowledge. This is emblematic of philosophy and philosophers. The search for truth at once attracts us to the possessors of knowledge; we are even overawed at the vast attainments of the human mind in the arts and sciences which minister to the needs, theoretical and practical, of human beings. Yet this knowledge is not wisdom. What the philosopher would possess is comprehension of the human activity itself, in its full, concrete, universal meaning.

Can we not then define with clearness and precision the special subject-matter of philosophy in its full technicality? I think we can. Valuable and necessary as it may be to indicate the general nature of philosophy in literary and figurative form, we always, when we do so, leave behind a feeling of dissatisfaction. Vagueness and shapelessness seem to characterize philosophy, and then we are inclined to draw a sharp contrast between it and science. Scientific

knowledge appears precise and systematic and moulded on reality ; philosophic knowledge, nebulous and indefinite, with no sure outlines, and concerned only with what is purely ideal. Yet even to the extent to which this is true it does not necessarily indicate an advantage of science and a disadvantage of philosophy, for we can show that the precision of the mathematical and physical sciences is due to their abstractness and therefore to their poverty when compared with the richness of philosophic truth. In saying this I do not mean to disparage the sciences. I mean only what Kant pointed out at the end of the *Critique of Pure Reason* when he made the comparison between mathematical and philosophical truth. In mathematics, he declared, we make synthetic judgments which positively extend our knowledge of reality, while in philosophy any such extension of knowledge is impossible. But the apparent defect of philosophy is due to its wealth and not to its poverty.

Philosophy is the science of the monad, and the order and arrangement which it studies is the monadic order. Philosophy is monadology. The term was first made familiar in the celebrated work of Leibniz which bears that title. In adopting it I am not advocating a mere return to Leibniz either for the formulation of a particular doctrine or for a new point of departure in philosophical theory. I mean that the term expresses, in a way which no other term will, the true technical subject of philosophy and the nature of its special task. We have come, it is true, to associate it with the special form which Leibniz gave it in his system, and more especially with the difficulties he strove to overcome by the hypothesis of the pre-established harmony. I propose to use the term in a sense in which it seems to me no philosopher can reject it, because it indicates the reality or fact of living experience which is the ground of philosophy as a distinct study.

What then is this fact of living experience ? It is the mind of the finite individual, the mind which each of us experiences in himself and recognizes in others. This mind is utterly unlike anything in the physical world, and indescribable by any of the categories under which we

classify physical things. In the first place, none of the spatial categories apply to it at all, and in the second place, the temporal categories acquire, when predicated of it, an entirely different signification to what they have when used of physical things. The mind is a monad, and a monad is, in the words of Leibniz, "a simple substance, 'simple' meaning that it is without parts." The mind appears to us indeed at times as a stream of consciousness and this stream seems to break up naturally and artificially into distinct and separate states, but reflexion shows us at once that the states are not elements or constituents of the mind, for the whole undivided mind is in any one of the states. There is, it is true, a mental order or arrangement, but it is of a different character altogether from the order or arrangement of physical nature which we study in the mathematical and natural sciences. The mind in its integrity is the subject of philosophical science.

At every moment of living experience and from moment to moment of experience we are confronted with two orders of arrangement to which we must conform and to which all our actions are adjusted. Each order seems independent in itself, and self-sufficing in its principle, and yet the two orders seem interdependent on one another. The one is atomic, the order of nature; the other is monadic, the order of mind. The two principles, the atomic and the monadic, seem irreconcilable. Moreover, each in its universality seems to exclude the other. Yet, to quote again the words of Leibniz, "the monad is a simple substance which enters into compounds." Thus every finite individual is a multiplicity and a unity. Its living activity depends upon the union in the one individual of two principles which are antithetical and divergent. The subject of experience is mind and body. The body relates the subject to an order of nature of which the body is itself a part, the mind encloses the subject in a private universe which has neither inlet nor outlet. Each, mind and body, indicates a system of relations and a principle of order or arrangement to which the individual must conform. Let us turn, however, from these technical and abstract formulations and see

how the seeming paradox is exhibited in plain facts of experience, illustrated in the most ordinary course of our daily life.

I enter a railway carriage in which other passengers are seated. I at once arrange myself according to the order which I think of as physical reality. There is a space common to all the objects and the objects are juxtaposed within it; there is a time common to all events and the events are in a fixed relation of before and after. I and my fellow-passengers are physical objects among the other physical objects. We occupy space and have a definite range of activity, that is, a possibility of free movement within definite spatial and temporal limits. This order is an atomic order. Quite apart from any philosophical or scientific difficulty in regard to the concept of the ultimate nature of an atom, the whole order and arrangement is conceived as that of elements or constituents whose reality and individuality consists in adverse space occupancy. I and my fellow-passengers ultimately consist of constituent parts from which it is possible to abstract every quality but one, namely, the occupation of a part of space.

This then is the atomic order, and to belong to it or form part of it is, in the common-sense and scientific meaning, to exist. But there is another order. Each of my fellow-passengers is, like myself, a mind. Each mind is a universe, a universe reflected into a centre, as though into a mirror, and every centre is an individual point of view. Between one mind and another there is absolutely nothing in common, neither space nor time, neither object nor event. To a mind all reality is experience and to each mind its own experience. All experience is personal experience. Thus I and my fellow-passengers each knows only a private space and a private time, and the objects and events which for each of us occupy this space and time are private and incommunicable. I look then at my fellow-passengers, and I know that for each of them, as for me, there is a centre of attentive interest, and I know that everything which I find it convenient to say is common to all of us, is really for each mind an abstraction of some part or aspect of its own

absolutely self-centred system. The order into which, for each mind, every new experience enters is not atomic but monadic. Everything to which I attend becomes part of my experience, and an organic part of it. It qualifies the whole and it receives its character from the whole which it qualifies.

Let us now compare the two orders in regard to the dynamic principle which underlies them. I and my fellow-passengers are so many physical objects of a definite form and structure who occupy space and endure in time. Like all physical objects we interact, and we interpret this as meaning that we belong to one and the same system of reality. Within this system every movement is exactly compensated. We are causally related with one another within the system of which we are a constituent part. All this has come to seem very plain and self-evident, that is, to require no logical proof, and we name the principle which holds the parts of the system together in reciprocal relationship, causality. It would be impossible, of course, to demonstrate to any one who should dispute it that there is in fact an exact equivalence between every action and reaction in the system, but it is so fundamentally necessary to our concept of scientific reality that, though theoretically the principle may be doubted, practically it cannot be disbelieved. The causal concept depends upon the atomic concept, for although space is divisible, theoretically to infinity, yet everything which occupies it is determined both in itself and in every part of itself by its external relation to every other part. This atomic order with its principle of external relations and causal equivalence of action and reaction is the subject-matter of the natural sciences, and their range is practically unlimited. I know, for instance, that my fellow-passengers are highly complex structures organized on a common type for the performance of marvellously co-ordinated actions. To all intents and purposes the natural sciences open to me a range of inquiry which is infinite ; but it is a distinct order of reality based upon a precise concept of a fundamental physical reality common to all subjects of experience, in which each has a definite

place in a space order and a definite span in a time order. The atomic order means therefore that I recognize a common world in which I and my fellows and every infinitesimal part of me and of them have their inalienable right to be.

Let us now consider the monadic order. The common world which exists for our bodies does not exist for our minds. Our mind is an inner which has no outer, and this is equivalent to saying that for the mind inner and outer have no meaning. They are really distinctions which belong to the atomic order of the body. In intimate union with each of the conglomerations of atoms I call other people, which jostles against the conglomeration of atoms I call myself, there is an invisible, intangible, impenetrable reality, not common to all of us but absolutely private to each of us. The elements or constituents of this world are thoughts, feelings, sensations, desires, images, notions, recollections, purposes, intentions,—but these are not atomic elements. When my body dissolves, its constituents remain ; they are only dissociated. When my mind dissolves, there are no constituents which exist dissociated. The mind is individual and absolutely indivisible. The phenomenon of dissociated personality, for example, is altogether different in its principle from the common fact of material dissolution.

The mind of a finite individual is a monad, and in using this term to denote it we mean to indicate that the categories we employ in the physical and biological sciences are inadequate. They are inadequate because they are fashioned to deal with compounds and analyse their components. The mind is not compound but simple, and only exists in its integrity. This is our reason for holding that philosophy is science of the monad.

This twofold order of reality, atomic and monadic, is not only met with in the familiar case of the relation of mind and body, it is present throughout the whole range of human knowledge. Whatever in the universe we can come to regard as a subject of experience is a monad. I may illustrate my meaning if I adapt to modern scientific concepts an old-world parable. " The Kingdom of Heaven,"

it was said, " is like to a grain of mustard seed, which a man took, and sowed in his field : which indeed is the least of all seeds : but when it is grown, it is the greatest among herbs, and becometh a tree, so that the birds of the air come and lodge in the branches thereof." The sort of miracle of natural processes which appealed to the spiritual teacher, and gave him his parable, is precisely the mystery which baffles the scientific systematizer. The small mustard seed is a constellation of molecules and atoms which obeys the atomic order of the physical world. Its analysis,—chemical, physical, electro-magnetical,—offers no difficulty, neither, save for obvious practical difficulties, does its synthesis. So far as it belongs to the atomic order its nature is transparent. But then there is something else, something which makes the mustard seed no part whatever of the atomic order, something indescribable as anything, something which not merely defies scientific analysis and scientific synthesis but in respect of which scientific analysis and scientific synthesis are meaningless and absurd. We can analyse and synthesise a constellation of molecules, but we cannot analyse and synthesise a past experience, or a present activity, or a prospective end or purpose. These belong to a monadic order. It would, of course, be merely figurative to speak of the mind of a mustard seed ; but when we consider the mustard seed in the unity, simplicity, and indivisibility of its individuality, holding in its present activity its past and expressing itself from its own standpoint as a finite living individual centre, the mustard seed is a monad.

The monad is not, therefore, the concept of an exalted order of existence, transcending or hovering above a lower mundane order, it is any reality when we view it from its own individual standpoint. Anything, however lowly and however limited the range of its activity, which we apprehend as being itself the subject of individual experience,—a subject owning its predicates, not a substance displayed with its attributes to the contemplation of another,—is a monad.

When we view the world in this aspect of it we see what

Leibniz meant when he said "the monads are the true atoms of nature." We can view the universe as consisting of monads and of nothing else. We cannot conceive a universe consisting of atoms and nothing else. A monad is a true unity, a unity which makes a many one. An atom is a unit, not a unity, it is one of many. Leibniz gives us a striking illustration, as remarkable for its scientific anticipation as for its philosophic insight. "In the smallest particle of matter there is a world of creatures, living beings, entelechies, souls. Each portion of matter may be conceived as like a garden full of plants and like a pond full of fishes. But each branch of every plant, each member of every animal, each drop of its liquid parts is also some such garden or pond. And though the earth and the air which are between the plants of the garden, or the water which is between the fish of the pond, be neither plant nor fish; yet they also contain plants and fishes, but mostly so minute as to be imperceptible to us. Thus there is nothing fallow, nothing sterile, nothing dead in the universe, no chaos, no confusion save in appearance, somewhat as it might appear to be in a pond at a distance, in which one would see a confused movement and, as it were, a swarming of fish in the pond, without separately distinguishing the fish themselves."

The moment we attain this standpoint philosophy acquires a special meaning, and a whole range of new problems comes to view. These concern the nature of the monad, the plurality of the monads, and their relation to one another. Also a whole set of problems will arise in connexion with the relation of the monadic order to the atomic order; problems of perception, of intuition, of intellection, of volition, of action; problems of intercourse, of social order, of the individual and the trans-individual. These problems will arise in their order. Let us first then give attention to what is essential in the concept of the monad itself.

I have given some instances of the kind of existence denoted by the term monad and also of the mode of being on which the monadic order depends. My mind and the

minds of my fellows are monads, any centre of living activity such as a seed or a cell of my body may be viewed as a monad, and in general anything whatever which can be, and in so far as it is, considered from its own subjective standpoint as a subject of experience is a monad. I will now, still keeping these particular instances in mind, try and set forth the essential and distinguishing character of the monad. It is expressed in the negative qualification "windowless." We owe this picturesque expression also to Leibniz. "The monads have no windows by which anything can enter or pass out." This has proved a great stumbling-block to the acceptance of the doctrine of the monad. It introduces a paradox into the concept itself. There is intercourse between mind and mind; minds are monads; if then there be no inlet or outlet through which influences pass, how is intercourse possible? Many philosophers, confronted with this difficulty and anxious to retain the concept of the monad, have declared that the monads have windows, that they interact after the manner of physical things, with the difference only that they belong to a higher order.

If we suppose the monads to have windows, then indeed the difficulty of the problem of interaction disappears, but with it disappears also the essential character of the monad. The monad is no longer a monad, it is transmuted into its opposite, the atom. To say that the monad has windows is as though one should say that the circle has angles. It has been held indeed that the circle is constituted of infinitesimal straight lines. Such a concept of the constitution of a circle would be to me the exact parallel of the concept of interacting monads. But is it not the negation alike of the geometrical and of the metaphysical concept? I propose then to examine this qualification "windowless" not as a question of theory but as a question of fact. Let me try and first explain what precisely is meant by this negative character and indicate its particular application in the instances of monads I have given.

Let me return then to the illustration of my fellow-passengers in the railway carriage. They are minds and

minds are monads. I can communicate with them and they with me. For such communication we are dependent on physical signs,—facial expression, gesture, bodily movement, and above all, spoken words. We are also dependent on special adaptations of our bodily organisms,—sense-organs and their neural connexions. All these means and instruments of communication belong to the atomic order, but they seem to intervene between mind and mind and to serve as an independent medium for the interchange of thoughts, wishes, desires, actions, which belong to the monadic order. There is intersubjective intercourse, and it is effected apparently by something common to the communicating minds which at the same time is external to each. How is this conceivable unless we suppose the monads have windows? When, however, we conceive the mind and its intercourse in this way we are not conceiving the mind as a monad at all. There are not monads and atoms existing side by side in a spatial universe; there is a monadic order and there is an atomic order. Each order is universal and the presence of one is the absence of the other. When we describe intercourse as an influence propagated from mind to mind through the medium of the physical world, we are not conceiving these minds as monads, subjects of experience, but as substances, essentially atomic, notwithstanding their negative qualification of being inextended. We are, in fact, conceiving the mind very much as Descartes conceived it when he supposed it to be seated in the pineal gland. We regard it, with its furniture of images and concepts, as existing apart from and externally related to an extended world in space through which it communicates influences to other minds by creating and propagating disturbances in an atomic environment. In the monadic concept the means and instruments are not external to the monad, and the communicating monads, though completely independent, are not spatially juxtaposed. Here, then, we touch the great difficulty in the monadic concept. The monad is a concept unlike all our ordinary concepts, because, while these are based on a spatial schematism, space being the basis of the concept of externality, the

monad is the concept of a reality more fundamental than space and externality. The first essential inquiry therefore is, why must we conceive mind as a monad? What is the necessity compelling us to this intellectual effort? Why may we not rest satisfied with the ordinary view that mind is a particular kind of existent thing? The answer is that the ordinary view of the mind, however serviceable and convenient in practical life, is theoretically contradictory and leads to actual absurdity. This will appear if we direct our attention to the problem of language.

In the Academy of Laputa, described in *Gulliver's Travels*, there was a department assigned to "the projectors of speculative learning." One of these was a professor who had contrived an ingenious machine, by means of which "the most ignorant person at a reasonable charge and with a little bodily labour may write books in philosophy, poetry, politics, law, mathematics and theology, without the least assistance from genius and study." The professor's pupils were engaged in breaking up printed sentences into their component words, rearranging the words by means of the professor's invention, and composing treatises by selecting the new combinations when they were found to have meaning. Obvious as the absurdity is, it is worth while to take the pains to discover the nature of the illusion on which the whimsical plausibility of the story rests. It will be found to be identical with an absurdity which we never suspect but which is inherent in the common opinion of the nature of intercourse by means of language or speech.

The learned professor of Laputa might have defended the notion, to which he gave practical effect in his machine, by an argument of unquestionable cogency. It is an undeniable fact that words combined into sentences convey meanings; when, then, words are combined meanings are created; consequently a mechanical device for combining words will be a simple and economical way of creating meanings; meanings once created, it will only remain to select, classify and preserve them in treatises.

The answer seems so easy, that even to tender it appears to argue a lack of the sense of humour. It is enough, we

should say, to point out that words are a conventional device to express meanings. Unless there are first of all meanings, words, which are only means of expression, are, if spoken, void and empty noise; if written, visual marks or traces, not signs. It seems, therefore, that meanings must exist prior to and independently of the words which express them, and so we might suppose that the illusion on which the absurdity rests consists in treating words as still expressing meanings when they are divorced from their meanings. It seems to us indeed that two entirely distinct and separate entities join together in speech; first, internal unexpressed intuitions, and second, external physically produced sounds. Speech seems to be an artificial combination and external relation of two things, completely independent of one another in their existence. One of these is a mental thing or meaning, the other is a physical thing,—the definite sound-wave or combination of sound-waves which we name a word. Yet reflexion reveals the curious and generally unnoticed fact that when we divorce a word from its meaning it ceases to be a word, and when we divorce a meaning from its expression the meaning disappears without a trace. There is no unexpressed intuition, and there is no word existing in its own right. The absurdity of the professor's invention rests, therefore, on the universally accepted but false opinion that intercourse is effected by the union of a wordless meaning and a meaningless word.

This twofold illusion is deep-seated in ordinary thinking and very persistent. We think, and act, and generally conduct our whole practical life on the assumption that our intuitions, our inner thoughts, and our feelings, exist in their own right and entirely independently of any means which we may find of expressing them. The means oftentimes seem absent altogether and always, even when available, more or less inadequate. On the other hand, this means of expression, whether it be plastic material or, like spoken language, the propagation of controlled vibratory movements in a fluid medium, is always, as physical existence, independent of the psychical use made of it. The illusion,

therefore, if it be an illusion, is founded on what appears to be very fact of existence.

What are words ? They are parts of speech, spoken and heard, or if written, visual marks which serve as conventional signs of uttered words. There is an eighteenth century story which relates that on a voyage in the Arctic Circle, a ship sailed into a region of cold so intense that the words of the crew froze as they were uttered and remained suspended, unable to reach the ears until set free later on by a sudden thaw, when they were heard all together. The gramophone has robbed this tale of much of its original delight of extravagance. Actual words with all the characteristic inflexions of the speaker are now stored in records and can be produced at will by purely mechanical devices. There are, in practical working, applications of this device of marvellous ingenuity. There is, for example, a telephonic apparatus which will give warning to the mariner approaching a dangerous coast by actually calling out in uttered words the nature of the danger and the way to avoid it. We cannot help, therefore, treating words as definite things, existing in their own right, which we, by means of our organization of sound production and sound reception, use as the means of communicating our ideas. For the deaf and dumb, spoken words have no existence, not because the words are non-existent, but because the means of apprehending them are wanting, just as for the blind there is the lack of means of apprehending light and colour. For the normal organization, therefore, there are words without and intuitions within, and all that is necessary is agreement on a convention which will attach a particular intuition to a particular sound.

If, however, we consider what a word is when we abstract from its meaning, we see at once that whatever form of existence we leave to it, it has ceased in any sense to be a word. The whole of the definition, the fixity, the objectivity, which bestows on a sound the individuality of a word is due to meaning and to nothing else. Speech consists in producing, by means of the larynx and its accompanying muscular mechanisms, sound-waves within a certain range

of frequency and amplitude, and imposing on these a form and definition which the receptive organ, the ear, can select and distinguish. Production and reception are strictly relative but the relation is not external. Neither medium nor waves propagated in the medium possess in themselves the forms which words assume. There is no identity or fixity in a word which is due to physical structure.

If again we consider what a meaning is without words or some other form of expression we shall find that we fail altogether to give either form or content to the notion of it. We often speak of thoughts too deep for words, we are accustomed to think that we feel what we cannot express, and generally we suppose our mind to consist of a wealth of intuition out of all proportion to its means of expression. Does it accord with fact ? The very act of reflecting on the intuition is itself an expression. There are no doubt infinite degrees of clearness or of confusedness in the expression, wide differences in the power or efficiency of the expression to be communicable to another mind, but no introspection will bring to light an intuition save and in so far as it is expression.

We find in fact when we analyse the descriptive account of intercourse which we accept as self-evident, that we are really taking for granted several notions inconsistent with one another and putting them together regardless of their incompatibility. Our ordinary notion of the relation of the mind to the object of knowledge and of the relation of one mind to another mind is in fact absurd. The absurdity is disguised in practical life because it is convenient and convenience is more important than logical consistency. So when the absurdity is exposed, as for example in the story of the Laputan professor's machine, we are amused but not arrested. We find it difficult to suppose the humorist is in earnest. In philosophy, however, logical consistency is the criterion of truth. Let us first, however, indicate the incompatibility of the notions.

We suppose that there are two different kinds of world, an inner world of mind and an outer world of nature, and

their relation to one another seems to be of the following order. Minds are separated from one another and also united to one another by the outer world of nature. This outer world is a system of external relations, and minds seem in the first place to be in definite external relation to it and through it to one another. It is by means of external relations, and not directly mind to mind, that we suppose we communicate with one another. We think the mind is in the world although it does not occupy any of the space of the world or interfere with the real stuff which we suppose does occupy that space. The mind is an ideal world of meanings; nature is a real world of things. It seems to us *prima facie* absurd to suppose that the mind holds the world of physical reality within itself or that in any way whatever that outer world can be an essential part of and belong to the inner world. On the other hand, we find it natural to suppose that the spatial world would remain undisturbed in its existence were there no mind. This is our ordinary notion of the two worlds and their relation. Minds are behind, as it were, and in some way attached to, certain definite material structures, and at the same time independent of and distinct from the order to which those material structures belong.

When, however, we make our notion of a mind definite and explicit, we see that mind consists of feelings, thoughts, and wishes, held together, not by a material bond but by a continuous memory, and owned by a centre of active experience which we call the ego or self. The wealth of a mind consists in intuitions and concepts. All its wealth it has originated within itself, and only what it has originated can it possess. We never think that feelings, ideas, desires, pass out of one mind and enter into another, nor that they arise in the mind in any other manner than by a process wholly within the mind itself. A thousand homely proverbs bear witness to the universal acceptance of this notion. "There is no royal road to knowledge," "A man convinced against his will is of the same opinion still," and the like. It is true that we always associate a brain with a mind, but also we ordinarily distinguish very clearly between the mind

and the brain, even if we believe that they are existentially inseparable. The continuity which makes the constituents of mind a unity is memory, and the mind is the interrelated system of meanings held together by memory. Memory is the substance of personality in the conscious subject of experience. Meanings can be expressed and communicated, but they can only arise within the mind to which they belong and for which they exist; they never pass out nor come in from outside. This is the fact we are affirming when we say that the monads have no windows.

The external world when we make our notion of it explicit is a system of reality conceived as the direct converse of mind. It has a unity but its unity is of another kind. It is a system of external relations with no privileged centre and no part of which has an exclusive nature. It is true we image it as an aggregate of particular things, each of which seems to own its qualities, but we come in our ordinary scientific inquiry to regard this image as a mere first appearance of, and approximation to, the true notion. The essential feature in our concept of the physical world is that there is an extended substance, every part of which is open to influences propagated from every other part. Its continuity is not, like the continuity of mind, in its inner nature. It is the notion of space which gives continuity, and space is the notion of externality. The external world is conceived therefore as a system of events arising out of the interactions of a material substance in a framework of three-dimensional space and one-dimensional time, a system in which every movement is exactly compensated by a reciprocal movement and every constituent or element is in causal relation with every other.

Our notion of knowledge is that it is a relation between minds and the external world. The relation is that of subject to object. The images and concepts of the mind, its ideal constituents, are supposed to represent the reality of the external world. Knowledge is truth when the ideas of the mind faithfully and adequately represent subjectively for the mind the objective independent external world. We suppose further that the mind can not only express itself in

the external world but can use it as a means of intercourse with other minds.

These ordinary notions—the mind, the external world, knowledge—when we examine them critically, are incompatible with one another and inconsistent. The discovery may and usually does surprise us, but it is no passing illusion, it is clear and manifest whenever we reflect. It requires no dialectical subtlety to discover that if the individual mind be as we suppose, a unity of the ideas which arise within it ; and if the external world be as we suppose, an independent existence indifferent in its reality to the ideas of the mind ; and if knowledge be as we suppose the valid and adequate representation of the world in the mind ; then, either knowledge is an arbitrary and groundless hypothesis or our notions of mind and world are wrong. There cannot be an agreement between an ideality and a reality if by their very definition a common factor is excluded. There is nothing recondite or abstruse in this dilemma, it is patent to every one who reflects. How, then, we may ask, are we able to go through life as we undoubtedly do, with this obvious absurdity barely concealed in our ordinary common-sense notions ? The answer I have already indicated in saying that in practical life convenience is of more importance than logical consistency. It is well, however, to observe the device by which this " convenience " is maintained. The paradox of our common-sense notion is concealed from us by the image with which we portray the whole process of life and mind.

The image which seems naturally suggested to us by our general view of the world and confirmed by common experience, is the image of a mind dwelling within the chamber of the living body as in an abiding-place. The body is then pictured as a closed chamber but a chamber with windows, the windows being the sense-organs, through which the mind surveys the world beyond. The theory when stated in scientific terms is named animism, and finds illustration and expression in innumerable religious beliefs and practices and also in philosophical doctrines. With these we are not concerned. Apart from any scientific,

philosophical or religious doctrine, this image of the mind as having an abode and of the body as being this abode, is fundamental and ineradicable. It accords with the analogies of living experience and has come to appear as not itself an analogy but a direct and immediate datum of experience. It is this image, constantly accompanying us in our philosophical effort to express a pure concept, which fills the background whenever we try to present the theory of the monad. The monad is windowless not because it dwells in a dark chamber but because it is the conception of the subject of experience in its integrity.

We can now give precision to the character " windowless." It does not imply that the monad suffers from a defect nor does it denote poverty or deprivation. It is the distinctive feature in a new notion of what reality is and in a new way of conceiving it. It does not mean that monads might have windows, like the sense-organs of the body, but are unfortunately without them. It means that we are conceiving reality and ideality, existence and knowledge, in a different manner from that of science and common sense. We are compelled by a philosophical necessity to adopt a new way, because as we have seen, particularly in examining the ordinary idea of the process of intercourse, the notion that the mind is the disinterested contemplator of an independently existing world, looking out upon it from its vantage-ground in a living body, fashioning ideas into conformity with reality for the benefit of the body it inhabits, and communicating these ideas to other minds through other bodies, is an impossible and inconsistent notion which leads to absurdity.

The monad is the concept of an individual experience as an integral unity in which subject and object are distinct but united in an indissoluble relation. Subject and object are not separate existences held together by an external bond. They are a unity in duality, a duality in unity. Suppress either term or the relation which binds them, there is no remainder, all is dissolved. To separate the subject of experience from the object of experience, or the object experienced from the subject experiencing, is like

dividing the circle into centre and circumference and supposing that each exists in its own independent right. The monad includes self and not-self, mind and nature, in the unity of an individual experience. In each monad there is the one and only centre into which the universe is mirrored and one universe mirrored into its own centre. When then we say the monad has no windows, we mean that so far as the objective world is concerned the image of the subject looking out of a chamber on to an alien universe is superseded. There are no separate worlds of the subject and the object and distinctions fall within the monad.

Besides the subject-object relation there is also a subject-subject relation, or rather, if we take the subject-object as included in the monad, there are many subject-objects and a plurality, even an infinity, of monads. How can the monads be related if they have no windows? Without going into the problem of the plurality of monads and of the relations of the monads, it is sufficient for the immediate purpose before us to show that the concept of windows, were we to adopt it, would be of no service, would indeed be without meaning. If we find it difficult to understand how one mind can know another; how two minds can enter into a common life which is then no longer the aggregate of the two lives but the whole life of each; how individual experience expands in intersubjective intercourse without increase or decrease of actual content; our difficulty is not in the "windowless" character of the monads. The concept is not spatial. The subjective experience of a nation does not cease to be the experience of the individuals who constitute the nation. There are no windows in the individual out of which his experience can pass to enter on the new national life. When a man devotes his life to his country, in enriching his nation he is not impoverishing himself. This is the meaning of the saying that the monads have no windows.

Intercourse between mind and mind seems to us then theoretically impossible if the monads, that is, the minds, are windowless, and yet practically we know that the monad is windowless by our experience of this very fact of inter-

course. The whole concept of moral conduct rests on and illustrates the fact that the monad is windowless. Consider such concepts as humanity, nationality, church, state, tribe, family, the matrimonial and parental relation—these concepts have no meaning save for individual lives. Every one supposes individuals in relation of intercourse, yet there is no life outside the individual lives and each concept stands therefore for a higher degree of realized individual life. Thus a nation consists of individual lives and has no separate existence outside the individual lives of those who constitute it; what is it then? It is a fuller and higher degree of each individual life. Nothing passes out of the individuals to form a new combination, the individuals each gain a higher degree. So we have the apparent paradox of a man losing his life to save it. The same truth is illustrated in every relation of intersubjective intercourse. The man who loves a woman, the woman who loves a man, lose nothing of their own individuality in loving. This is expressed in the paradox "they twain shall be one flesh." Their union is not interchange, neither receives nor parts with anything which belongs to its full individuality but in seeming to give all each gains all. In the perfect union of two loving souls the two monads remain two windowless monads.

To sum up, then, the mind taken with its experience in its integrity and indivisible unity is a monad. The monad is a simple substance, but substance conceived as an active subject owning its activities and not as a substratum of qualities or attributes. The monads are the true atoms of nature. They are not units but unities. They represent a mental or spiritual order, and are not to be confused with physical atoms which represent nature as an external order independent of mind. Experience obliges us to regard real existence from two different standpoints, namely, as a system of external relations and as an all-inclusive activity. To the individual mind, nature appears as a world which it contemplates, and yet perception and action are wholly dependent on and exist only in and for its activity as a subject. Our practical

life obliges us to regard the world as an extended sphere of activity, consisting of a common space and a common time, within which common objects are juxtaposed and events are before and after one another. By common is meant that which is one and the same for all contemplators. Space, time and material are the fundamental data of this world and its constituent atoms are conceived as forming part of a mechanical system of action and interaction. On the other hand, experience is itself an order which is pivoted on and revolves around an active subject. The subject is the centre from which activity is directed and controlled and into which the whole universe is reflected.

The monad is self-contained and all-inclusive; yet experience obliges us to recognize that there is a plurality of monads, because there are other minds and infinite possibilities of subjective centres each of which mirrors the universe. The relation of the monads is not juxtaposition but harmony or accord. Units (atoms) form aggregates by addition, combination and disposition. Unities (monads) make the many one. Monads therefore enter into compounds but not by way of addition. The type of the monadic order is seen in the relation of mind to living body. Each organ of the body and each constituent cell of each organ is a monad. The mind which makes the many one is not quantitative.

"The monads have no windows by which anything can enter or pass out." This negative description gives in effect the positive character of the monad and serves to mark the principle which distinguishes the monadic order from the atomic order. It means that every centre of living or conscious activity possesses the unity of a subject of experience, and that every change in the state of such a subject is wholly determined by the subject and self-inclusive. No monad by intercourse with other monads parts with its substance or deprives other monads of their substance. The monad does not dwell within the body and look out on nature through the sense-organs as through windows. Neither does it grow by seizing what is without and adding it to what is within, nor yet does it diminish

by dispersing activities in actions. There are not monads and atoms. When we view real existence as a monadic order there are no atoms; when we view it as purely a system of external relations, that is, as atoms, there are no monads. The two orders are not of equal validity. When we view reality as atoms we are taking an abstract view for a practical end.

CHAPTER II

THE MONAD'S PERSPECTIVE

As the same city regarded from different sides appears as other cities, and is, as it were, multiplied perspectively, so, by the infinite multitude of simple substances, it comes about that there are as many different universes; they are, however, but the perspectives of one only, according to the special point of view of each monad.—LEIBNIZ.

THE monad mirrors the universe and the universe consists of monads, for there is nothing real but monads; to each monad therefore the other monads must present an external, objective aspect; how is this possible?

It is not difficult to recognize the facts upon which the monadic theory is based; it is difficult to avoid presenting those facts in a spatial setting and so completely concealing their true nature. We may easily be convinced of this. Nothing is clearer than that the distinction between our body and our mind, between the things of the body and the ideas of the mind, is a distinction between what is spatial and what is not spatial. Our body is spatial, our mind is not spatial. Yet whenever we think of a mind possessed of a wider or narrower range of perception we invariably find that we form the idea by the device of imagining our body to possess larger or smaller spatial proportions. A large mind in the sense of a wide range of perception seems necessarily associated with bodily bulk. Thus when Milton describes Satan after his fall, lying with the rebel angels prone on the lake of fire, his body covers "many a rood." Yet it is clear from the definition of the monad as a centre of activity into which the universe is mirrored that the body is not that centre but itself a part of the mirrored universe. The body is not the subject for which the universe

is object, the body is itself part of the object which exists in and for the subject. The spatial proportions of the universe, and of the body as part of that universe, are the perspective of the monad. This means that if we accept the theory of the monads, it follows necessarily that we cannot regard space as an absolute reality within which the monads are. Space is not the unity or continuity which binds the monads together, and makes the many one. Space is the unity which binds together the diversity within the monad, but that is because the monad's activity is centralized and the universe is its perspective.

When I look up into the starry sky on a clear night, the immediate object of my visual perception is a firmament bespangled with myriad stars. Science has discovered that those stars are distant suns. An infinite universe of boundless potentiality and illimitable diversity lies beyond my ken, outside the system to which I belong and the range of activity which makes up my life. Yet every ray of light from however distant a star reveals to me, when I interpret its message, that the world from which it comes is of like nature with my world, subject to the same order, the same natural laws, and in every sense continuous with it. Again, beneath and within the smallest compass which I can distinguish as part of my tangible world there is a universe of infinite diversity. Science reveals to me that my tangible world is composed of ultimate constituents of a nature which I denote by the term electrical, constituents which form molecules, atoms, electrons, etc. The immediate objects of sense which lead me to conceive this world reveal in that world a unity of structure and a uniformity of behaviour which show it to be continuous not only with my own world but with the infinite stellar universe beyond. What is the nature and what the origin of this systematic unity? What is it makes this one many, this many one? What is the principle of interpretation which this unity demands?

The monadic theory rejects the view that the unity and diversity of the universe are qualities or characters inherent in an objective reality independent of the mind, presented

or given in passive contemplation. If we assume or posit such a reality, and suppose its presentation to the mind, and suppose the mind possessed of the power of discernment, it is still unintelligible how or that such reality could itself reveal to contemplation the character which is implied in saying that in it the many are one and one many. And we are in fact forced, as I shall endeavour to show, when we seek to make such character rational, to introduce a transcendent source of the unity.

The monadic activity is self-centred. The monad acts as a seed or germ acts when it is converting its inner potentiality into outward expression and action. A monad does not create or produce from itself the universe, for the monads are the true atoms of nature, and monad does not create monad. There are not monads and universes, but to each monad belongs its universe, which is the universe. The monad determines from within the perspective of its universe, inasmuch as it is a centre from which the universe is viewed and into which the universe is mirrored. In this perspective lies the principle of unity and diversity. Each monad is confined to its own perspective. But the very isolation which is thus affirmed postulates the infinity of monads, for there are infinite perspectives.

Every monad exists both in itself and for the other monads. In itself it is a subject of experience, living its experience, with its own perspective. For the other monads it is part of each monad's universe within whose perspective it comes and of which perspective it forms part. Thus while every monad is thing-in-itself and also thing-for-another, it is not for another what it is in itself and it is not in itself what it is for another.

It is not easy to see why unity and diversity in nature cannot be directly apprehended as attributes of a reality in which they are inherent, and it is most important to demonstrate this impossibility clearly at the outset. To ordinary common sense the monadic theory presents a distinct air of paradox. It seems unnecessary and even perverse to common sense to reject an interpretation of nature which is plain and straightforward for one which,

whatever fascination it may have for dialecticians, calls for an unusually difficult intellectual effort and carries us in the reverse direction to that of our ordinary habits of thought. The interpretation of uncritical common sense is that we discover in nature unity and uniformity because they are there to be discovered. It is part of a general uncritical theory, and as it is not unusual for philosophers to appeal to what they call common sense it is very important to state the theory with precision. Common sense is the view that things are in their independent existence what they are as we know them. It is not merely the belief or opinion that things exist independently of whether we know them or not, it is the affirmation that things which we know are in their own nature what they are as objects in our knowledge of them. Common sense is not dualistic in the philosophical meaning of the term, it does not distinguish mind as thinking substance from matter as extended substance. It has no theory of knowledge; it simply accepts what is as what may be known and what is known as being in itself what it is known as being.

Many philosophers have claimed for their theories of knowledge and reality that they simply formulate this naive realism of common sense. Berkeley, for example, was insistent that his theory, *esse* is *percipi*, expressed the ordinary unsophisticated man's meaning. We may admit that so far Berkeley was right, yet when he sought to justify the common-sense view of the permanence of existing things, —the view that our perceptions which we are actually perceiving are continuous with identical objectively existing perceptions which we are not perceiving (and this is common sense),—he was driven to posit as the ground of this continuity a transcendent cause. The claim of Berkeley to represent common sense is indeed one of the paradoxes of philosophy. Berkeley's theory is literally what the ordinary man to be consistent must mean, yet it is what the ordinary man never does mean. So that we may quote Boswell's words in the famous story of Dr. Johnson claiming to have refuted Berkeley's theory by kicking a stone, " that though we are satisfied his doctrine is not true, it is impossible to refute it."

The reason is that our first reflexion on experience, the ordinary reflexion which leads to scientific knowledge, brings home to us the evident fact that the particular form nature assumes in immediate apprehension is determined by perspective. Perspective clearly appertains to the mind and depends on its standpoint of observation and is not inherent in the object apprehended. Hence arises the distinction between the object of scientific knowledge and the object of direct sense-perception. Science we regard as peculiarly concerned with the task of determining what reality is when divested of every appearance which can be attributed to the observer's perspective.

Dialectical disquisitions on what common sense means, or ought to mean, by its affirmation of the real existence of the objective world, have an air of unreality. They never seem to come to close quarters with a real issue. It is both more important and more impressive to examine the notion of reality which serves as a basis of physical science. Just as the space of geometry is not the space of sense experience, so the reality which science treats as actual independent existence is not the reality of sense experience. It is a conceived, not a perceived, reality, and if it must be formulated in terms of a potential perception it is a perception which under no possible conditions could be actual. It is a conceptual reality which experience is held both to postulate and interpret. It is important therefore to lay this concept bare, that is, to show what is implied not in any particular theory of the constitution of the external world, but in the general notion, deeply seated in common-sense thought, that there is a real world with its own nature, independent of the mind whose object it may be, and that this world, whatever its nature, and however inaccessible to us, is the ground of knowledge and the only criterion of the validity of knowledge. When we examine the notion and follow out its implications we are likely to be amazed at its inconsistency, and we may even come to feel surprise that we should have somehow come to believe it as a matter of course, the antecedent improbability of its truth makes belief in it seem so extravagant.

The world of immediate experience is both diverse and uniform, it is many and it is one, its variety is infinite, its order universal, and this many-oneness is the principle which enables science to carry investigations beyond what is given in experience and formulate results which transcend any possibility of verification by actual experience. What sort of world must it be then if we assume it to exist in itself, and to display the character of many-oneness as its inherent property, to the mind which contemplates it? We are to divest the world of any aspect it may present which is due to the perspective of the observer and form a notion of it as it is in itself and unobserved. The world must consist of matter or stuff the form of which may be quite indeterminate but it will be absolutely conditioned in three definite respects, namely, (1) adverse occupancy of space (by adverse is meant that the occupancy is absolute and exclusive), (2) perduration of time, and (3) mobility, that is, the power to occupy a new position in space at a new moment in time. Space, time and mobility are the conditions of existence, but what really exists is the matter or stuff. These real conditions, however, are essentially principles of division and separation; by virtue of them real existence is many, not one. Space occupancy confers independence, space is an order of juxtaposition, the very concept of it implies the exclusiveness and therefore the independence of the occupant. Abstracted from mind and purely in itself real existence is a many which cannot possess any principle of unity to secure uniformity, for pure space and pure time possess no privileged point or moment such as exists in the experience of an observer. The diversity of the world so considered is absolute. But this is to deny to the concept we have formed the very condition which alone can make it the object of scientific knowledge. On the other hand, unity and uniformity are necessary conditions of mind and mentality from which we have made abstraction. The Greeks accounted for the unity and uniformity of nature by imagining the world populated with nature-gods,—nymphs, satyrs, river-gods and such like. The Christians rejected this as paganism and believed that the physical universe

was brought into existence by the personal creative act of God, but that at present it is to a large extent under the sway of Satan and his subordinate spirits of evil. Both systems of thought are mythological and anthropomorphic, but at least they recognize the fact that the unity of nature can only be conceived in terms of mind. The modern scientific concept of a physical world existing in itself and in abstraction from mind, and yet possessing and capable of revealing unity in its diversity, is a self-contradiction. For the reality of science is absolute in its manifoldness. There can in the very nature of it be no unity. Yet science assumes uniformity and conceives that its reality not only possesses it but reveals it.

The common-sense belief that the ground of our knowledge of the physical universe is the objective existence of that universe in itself and irrespective of its relation to our mind in knowing it, is not a dualistic doctrine and is not to be identified with dualism as a philosophical theory. Common sense does not set over against the object the independent existence of another kind of existence, the mind. It rather inclines to the view that the mind is nothing substantial, or, what is the same thing, that anything may be a mind. It is important therefore to point out that a precisely analogous difficulty would confront us were we to take mind abstracted from its object physical nature, as possessing independent existence. To suppose that the mind or subject of knowledge exists independently of the object of knowledge, that it would be unaffected in its nature and existence if separated from any and every object, could easily be shown to involve the same contradiction as that which we have noted in the common-sense belief. Yet common sense does not commit this logical error. The reason is that no practical need compels us to affirm the substantiality of mind. The things of the mind,—thoughts, feelings, volitions,—seem so unsubstantial that our natural difficulty is to imagine their independent existence, whereas the objects of the physical world are so insistent in their materiality that to regard them as in any way dependent on their relation to the mind seems irrational.

When we try to get behind the common-sense and scientific belief in order to discover and lay bare the rational need in our nature which this belief satisfies we find this deep-seated conviction. Whatever we regard as real must, it seems to us, possess an in-itself nature, however much the aspect it presents to an outside observer may belong to that observer's perspective. And it is precisely this need that the monadic theory is designed to satisfy. Monadism is not an attempt to establish for the subjective order of images and ideas a superior reality to that of the objective order of physical objects. In declaring the monads to be the true atoms of nature, that is, to be "reals," it is not denying the objectivity of nature but presenting a theory of it. Every "real" is thing-in-itself, yet its objectivity for a subject cannot be that in-itself-ness. Monadism reconciles being-for-self and being-for-another.

I will accordingly present the monadic theory in regard to what it rejects and to what it accepts of the common-sense notion of reality. It rejects the common-sense belief in an absolute space and time as the necessary background or framework of reality. There is no common universe of the monads, open to all and private to none. The monads are not circumscribed. They are not like a froth each bubble in which is bounded and shut in by the circumferences of the others. On the other hand monadism accepts the common-sense belief that whatever is real exists in-itself and for-itself and does not depend for its existence on presence in the consciousness or mind of another. It accepts also the common-sense belief that objects of knowledge are things-in-themselves. But it rejects the common-sense belief that objects are in-themselves what they are as objects of knowledge, or that knowledge of objects is knowledge of things-in-themselves, for things-in-themselves are monads. The most fundamental difference therefore is in regard to the concepts of space and time. For monadism these concepts are not, as they are for common sense, principles of the separation of reals; on the contrary they are principles of unity. They belong to the monad, they are the perspective of its universe. The difference is not whether space and

time are real or unreal, and common sense is not the view that they are real as opposed to monadism for which they are unreal; they are equally real for monadism, but the nature of the reality is conceived as fundamentally different. Space and time belong to the reality of the monad and are not the reality upon which the monad depends and from which the monad's reality is derived. The nature of space and time is therefore the problem of the monad's perspective.

One of the most important landmarks in the evolution of philosophical theory is the doctrine of Kant in the *Critique of Pure Reason* that space and time are brought by the mind to nature and not given to the mind by nature. But a century before Kant the problem of space and time had forced itself on the attention of philosophers as a consequence of the advance of purely inductive science. A difficulty arose over the question of the nature of magnitude. In the seventeenth century two scientific instruments were invented, the telescope and the microscope. Why mankind had had to wait so long for them is difficult to understand, for they were nothing more than practical applications, mathematically deduced, of the observation which must have been familiar even to primitive man, that objects seen through a spherical transparent body such as a drop of water are visually magnified. The new instruments brought new and ever wider realms within the range of accurate observation. They were also the occasion of a philosophical discovery of a curious nature and of wide speculative interest, the discovery that "great" and "small" have no absolute meaning, that magnitude is not a property or character intrinsic to real existences. I will state briefly the argument as it is given by Malebranche in his *Récherche de la Vérité* (Bk. I. Chapter 6,—a remarkable chapter which had a great influence on contemporaries. The argument impressed Berkeley, who has reproduced it in the first "Dialogue of Hylas and Philonous" and who also makes reference to it in "Siris"). Suppose I take a line an inch in length, I know by mathematical proof that it is divisible to infinity, yet a very moderate division brings me to the absolute limit of what I can actually distinguish, a limit below which

no fraction exists for me at all. But the inch may represent a mile and then at once hundred-thousandths of the inch are appreciable. Again, a mite (by which Malebranche meant any living creature so tiny that it is visible and no more) is for me a *minimum visibile*. Any part of it, its foot for instance, is less than my *minimum visibile*, therefore for me it can have no foot. But place the mite under the microscope and my *minimum visibile* is changed. I now view reality not from my standpoint, but as it were from the mite's standpoint. I find that the mite has an organism to some extent the counterpart of mine and a world which is not the cramped world of my ordinary perspective but a world in which there are magnitudes which correspond to mine. So I am led to conclude not only that the mite has a foot, but that its foot is of precisely the same order of magnitude as mine. In other words, from my ordinary point of view the mite has no foot, from my microscopic standpoint, if, as it may, it exactly correspond with the mite's ordinary standpoint, the mite has a foot as big as mine.

This may sound curious in the somewhat quaint example chosen by Malebranche, but the argument is not obscure. When we look at an object through a telescope or through a microscope we describe the effect as magnification of the object, in the one case a distant object, in the other a near one, yet it is quite clear that the object undergoes no kind of alteration whatever. If then we try to correct our statement we shall probably say that the object is unchanged but its appearance is magnified, yet this is not only a contradiction in terms but also a gross inaccuracy. An appearance cannot be magnified and the new appearance is not only different in its proportions but in kind. We may work out a point to point correspondence between the two appearances, but this would be in respect of abstract mathematical or logical characters; so far as imagery is concerned they are completely different. What in fact happens is neither change in the object nor in its appearance but change in the observer's perspective. The instrument enables me *pro tanto* to view the world as it appears to an observer in another system of reference.

Such an argument is generally supposed to be concerned purely with knowledge and not with the reality which we know. It may even be held that the relativity of our knowledge of magnitude implies the absolute reality of that of which our knowledge is relative. For example, we possess no absolute standard by which to measure time, but we do not base on that negative fact a denial of the reality of time. Again, we never see what we believe to be the true size of anything, for its true size would be that which would be seen if no distance intervened between the object and the eye, and in that position nothing could be seen. So it seems to us that the fact we all recognize that our knowledge is mediate and relative requires us also to recognize as a correlative truth that the reality in itself is absolute. This is not the case with the particular problem of magnitude. It is not merely that we do not know or cannot know the true magnitude of any object ; it is that magnitude is not a fixed determination of any objects.

Suppose two observers : one, A, has telescopic vision, and sees the world as we see the heavenly bodies when we look through a telescope ; the other, B, has microscopic vision, and sees the world as we see ordinarily invisible objects through a microscope. Let us suppose that each is looking at the same object, say the sun. In the perspective of A it will be a large expanse on which he distinguishes the various markings known to astronomers ; in the perspective of B it will, by reason of its greater distance, be a minute point of light. If it be an identical object for each observer as we are supposing, then either its actual magnitude is different or else the space which separates it from B is greater than the space which separates it from A. Either alternative involves the denial of magnitude. Moreover it is impossible to reduce the spatial difference to appearance. For let us suppose that A and B actually set out to travel together from a common starting-point to a common goal. Either the time occupied in the journey, though beginning at the same moment and ending at the same moment, is different for each, immensely longer for B than for A, or else the velocity of their movement

is different, immensely greater for A than for B. Either alternative involves the denial of magnitude. Yet again, suppose a light signal from an identical source to arrive simultaneously to each observer, then if the velocity of light be uniform, the source is in a different point of space for A than for B, or if the point in space be identical for each, then the velocity of light is not uniform but immensely greater for B than for A.

The usual explanation of the phenomenon of telescopic and microscopic vision is that each is a deformation of the normal appearance of a real spatial extension, that it is analogous to astigmatism or to the distortion of the convex and concave mirrors, or indeed to the ordinary accommodation to perspective. Such explanation will not hold. In these cases there is complete compensation which can be worked out mathematically. In the case supposed there is and can be no compensation. The inch of one is the mile of the other.

It is not intended to deny that any change which a particular object may undergo when viewed in a new perspective is accompanied by a correspondent change in every other object in the old perspective introduced into the new. Thus if the mite's foot, in Malebranche's example, appear the size of my foot, a correspondent change would occur in the magnitude of my own foot brought from the old perspective into the new. It may be argued, therefore, that the ratio between magnitudes is constant throughout all changes in perspective. This is not denied: but it means that the magnified foot would only be the size of the foot if everything were altered in the same ratio: and that means that the system of reference is changed: and that means that the magnitudes of the new system are identical with those of the old. What is denied is that there exists a standard of absolute magnitude, a standard which would enable us to fix a ratio between perspectives. In my normal perspective I myself am neither large nor small; I am the norm, and in that perspective the mite is infinitesimal. In the mite's perspective the mite itself is neither small nor large; it is its own norm, and if I come into its perspective

I am a gigantic object. There may be perspectives in which both I and the mite are objects, and in these they may preserve the ratio of magnitude they have for me and for the mite. What is denied is that there is behind and beneath these perspectives an absolute standard of reference such as the Newtonian space or the ether, a system of reference which determines the ratio of perspectives. The perspective itself is absolute, and the norm of magnitude in all perspectives is constant, not variable. It is this which is essential in the monadic theory. Reality is not an absolute within which monads are and from which their reality is derived. The monads are the reals.

The principle I have had in mind as directly contrary to the monadic principle is that known in philosophy as scientific monism. It interprets the many-oneness of reality by an absolute which is external to experience, that is, a physical basis independent of experience but on which experience depends. The philosophical monism, however, which is usually propounded as the most direct contrary of monadism is a principle of the universal comprehensiveness of experience. This is the idealist theory that the absolute is the one ultimate subject of experience, in relation to which finite individuals are adjectival. The opposition between this philosophical monism and monadism offers a contrast of an altogether different kind from that of scientific monism. There is essential agreement as to the nature of reality but divergence in the interpretation of its form. Absolutism insists on the one-manyness of reality, monadism emphasizes the many-oneness. Absolutism affirms that there is one ultimate subject of the logical judgment; that all propositions imply, if they do not adopt, the form "reality is such that . . ."; and that the absolute itself is a super-individual expressing itself in and through finite centres of experience. It denies that finite individuals are monads and that taken by themselves they are all-inclusive. It declares on the contrary that taken by themselves they bear evidence of their abstraction from the whole. They are torn out, as it were, from the whole to which they belong and manifest

their origin in torn edges. At the same time they exhibit a degree of reality, and it is this that gives them their individuality, so that finite individuals may approximate to the absolute itself in the degree of their reality. This brief and inadequate presentation of what is essential in Absolutism is necessary in order to make clear what is essential in the monadic scheme.

In order to present this monadic scheme in the simplest possible form, I will take an illustration which, though it must primarily be a representation in the reader's mind, I want to analyse not as a representation but as actually occurring experience. According to the theory, the monads are infinite in the positive meaning of the term, but I propose to select two monads and consider them in their separate existence and mutual relations as exhausting reality. My purpose is to make unambiguous the monadic theory of the nature of the multiplicity and unity of reality, and to show the essential respect in which it differs both from scientific and from philosophic monism.

In the descriptions of the battlefields in France during the great war, one of the extraordinary circumstances recorded by many observers was the persistence of bird-life continuing its ordinary activity, undisturbed, however inconvenienced, while havoc and destruction were being wrought in its environment. It is said that after an artillery duel or barrage of great intensity had ceased, the skylarks could be heard continuing their song which apparently had been proceeding throughout the terrific noise of the explosions. Let us picture to ourselves, then, a soldier after the battle listening to a skylark's song and the skylark above the smoke choosing its alighting ground with regard to the soldier in whose movements we may suppose it directly concerned. Let us take these two subjects of experience for our illustration,—the soldier and the skylark. Let us suppose the identity of their environment so far as anything we are accustomed to regard as physical reality is concerned, and let us suppose each to be within the perspective of the other. Let us consider them as two monads or "reals" and suppose them to be the whole of reality in the absolute

sense in which reality is experience, that is, let us suppress in thought the idea that there are any other subjects of experience. There is no difficulty in doing this, for the supposition involves no diminution of reality. The reality we will call the battle, and we suppose that it exists in the experience of the soldier and in that of the skylark and that they alone experience it. The battle is not to be thought of as a third thing, but as what each and both are experiencing. In what sense are these monads two, and in what sense one, and how is their two-ness reconcilable with their one-ness ?

The soldier and the skylark are each within the other's perspective, yet neither is for the other what it is in itself. On the other hand, one and the same monad is both in-itself and for-another and the in-itself existence is not existentially distinct from the for-another existence. There is therefore an essential two-ness which is not an existential two-ness. In what does it consist ? The answer is all-important. It does not consist in the obvious fact that neither lives the experience of the other. Such a proposition is true but purely tautological, involved in the bare concept of numerical difference. The true answer is that the two monads are essentially and substantially two because there is no identity of meaning in the experience of each, neither in the experience in its integrity nor in the minutest element or part of it on whatever principle it be analysable. On the objective side there is no common factor. Let no one accept this statement without challenging it. If there be a common factor, what is it ? The experience in each case is the battle. As that battle exists for each experient, whether it be conceived as a whole or as an infinite diversity, neither as a whole nor in any aspect of the whole or of its infinite detail can it mean the same to each. Such is the essential pluralism of the monads.

In what then, we now ask, does the essential one-ness consist ? The answer is that reality is not shared out between the two monads so that part is appropriated by one, part by another. Each monad is within the other's perspective, but in coming into another's perspective the

included monad leaves nothing of itself outside. There is absolutely no transcendence. The soldier's perspective which the skylark does not possess is not a detachable part of the soldier as he actually exists in the skylark's perspective.

This then is the principle of monadic explanation, and if I have succeeded in making it clear in the supposed case of two monads it will be seen that it is of universal application. Reality is experience; the subjects of experience are monads; every monad enjoys its own perspective not by reason of its spatial exclusiveness of other monads, but by reason of the inclusiveness of the monads in its universe. Finally, when a monad is within the perspective of another monad, the perspective of the included monad is not part of the perspective of the monad in which it is included.

There is yet a further point of great importance. It is only for a monad that there are monads; a monad is not in and for itself a monad, that is, one of the monads. Thus we may say the soldier and the skylark are monads, but we must not mean that each apprehends itself as a monad. We apprehend it as a monad when we recognize that in itself it is a subject of experience with its own perspective. The only way in which I can present myself to myself as a monad is by the device of imagining myself as in the perspective of another monad.

Thus monadism gives us a concept of reality in complete contrast with that which is assumed by scientific realism. The universe which comes within the perspective of the monad is real in the most absolute meaning of the term. Its reality does not mean, however, that what is within any perspective is in itself what it is in that perspective, but the direct contrary; what it is in itself is not what it is in the perspective. That alone is real which exists in itself, and knowledge of reality is knowledge that this in-itself existence belongs to what in my experience is my perspective. I recognize as real only what is in my perspective and by reason of its belonging to my perspective; but the reality I recognize is that what is for me a perspective has in itself a perspective of its own in which perspective I may have a place. What-

ever cannot be thought of as subject of experience cannot be thought of as real.

The philosophical gain of this theory of reality is that it dispenses with the concept of transcendent reality. There is no point in the theory of the monads at which it is necessary to bring in the *deus ex machina.* I say this advisedly, because Leibniz's theory of created monads and of a pre-established harmony, has probably, more than anything else, done him the disservice of concealing the strength and self-sufficiency of the principle he has the merit of having discovered. Leibniz felt himself under the necessity of reconciling his notion of reality with that of a creator God, and this introduces at once a discrepancy into the whole concept. "There is no way conceivable by which a simple substance can perish naturally. For the same reason there is none by which a simple substance can begin naturally, since it cannot be formed by composition. So we may say then that the monads can begin or end only all at once, that is to say, they can only begin by creation and only end by annihilation" (*Monadology*, 4, 5, 6). It is clear from this that it is not because without God their reality would be transient that the monads are in need of God. On the contrary God is required because the monads must not be self-sufficient as by their concept they are. They must be created and creation is an event in time. But in the monad time as well as space is within the universe mirrored. The time order belongs to the monad's perspective. Creation makes time an external condition of the monad, and the monad has no external condition. Leibniz, while endowing the monads with an indestructible nature in their relations to one another, postulates a transcendent God by whose creative act they are brought into existence as a system with a pre-established harmony, and by whose act they might, conceivably, be annihilated,—annihilated not individually but as a system. Partial annihilation would break up the system and destroy the harmony. Such an act of God is not wanted to give consistency to the monadic theory. Monadism as a theory is neither atheistic nor theistic for the sufficient reason

that its essential principle involves the inconceivability of transcending experience. For the same reason it is not agnostic, affirming a God and declaring him unknowable. Our perspective of the universe is not only from within the universe but from a centre into which it is reflected. We cannot view the universe from outside because we cannot be outside. The monads in our perspective are not the outsides of universes. Monads have no outside. The externality with which one monad endows another in its perspective is derived from that perspective and belongs wholly to it.

To create is to bring into existence what does not pre-exist. The monad is creative in its nature because that nature is essential activity. It is possible to create a work of art as Pygmalion created Galatea, when he sculptured her form in stone. It is impossible to create a monad, a living Galatea, for to do that is to create a human nature, which can only mean bringing into existence what pre-exists. It would be to create something the very essence of which is its past existence. There is, that is to say, a contradiction in the very notion of creating a living thing, for a living thing carries its past in its present activity. How can there be creation of the past ? Moreover, the very notion of creation involves the concept of a transcendent creator. Thus Pygmalion can only create Galatea if he already possess in idea what he will express in sculptured marble. The whole theological difficulty of the origin of evil, of sin and redemption, arises from the perception that in the very idea of creation is involved pre-existence as idea in the mind of God. We cannot escape the dilemma. "And God said, Let there be light: and there was light." What meaning can we give to this if we suppose before the creative act inexistence of light even as intuition in the creator's mind when called forth by expression in word ? It is clear therefore that anything we can call creation falls within and is not outside the monad. To create monads is inconceivable. To conceive God as a creator is to conceive God as monad, and it must then be true of God as of every monad that he is a living mirror of the universe and the

reality of that universe can only be the infinite monads within his perspective. Only a monad can create because only a monad can have that twofold activity which presents in idea what it will bring into existence; and a monad cannot be created or brought into existence because the present which alone could be created includes the past of which it is the outcome and holds within it potentially the future.

To sum up: I have argued that the monadic principle is the only philosophical principle which can do justice to the unity and manifoldness of reality, and which at the same time is under no necessity to sacrifice either character to the other. In interpreting the nature of the real it eschews the attempt to transcend it. It neither seeks the origin of unity in a transcendent character of the many nor the origin of the many in a transcendent one. The nature of the reality itself discloses the inconceivability of origin. It is not in appearance but in itself that reality is both one and many. It is not an agnostic limitation.

It is hard to convince ourselves that the mind's attempts to transcend reality are vain. We are indebted to Kant above all for having established this philosophic truth. The Ideas of Reason, objects of a transcendent reality,—God, the Soul, the World,—are not speculative ideas, but regulative ideas and practical postulates. We cannot know them because they are not objects within experience and we are not subjects outside experience.

On the other hand, monism transcends the given in order to affirm a one, superior to, more original and more real than the many. Scientific monism affirms a transcendent object, absolutism a transcendent subject, of experience. Absolutism therefore comes very close indeed to monadism inasmuch as it sees the principle of many-oneness in the subject rather than in the object. Both absolutism and monadism recognize that only what acts is, and that only mind or spirit acts. And moreover in the theory of degrees of reality it comes very close to the monadic concept. It fails and monadism succeeds just in the fact that the one

must, and the other need not, appeal to a transcendent principle.

Unity and diversity, the one and the many, can only be interpreted, then, on the principle that reality is monadic. The ordinary view of common sense which has formed the concept of scientific reality is that activity is exercised by the mind upon an independent material given to it. The monadic theory is that mind is self-centred activity developing like a germ or seed by converting inner potentiality into outward expression and action. The monad does not create its universe or produce it out of its own nature, for the monads are the true atoms of nature and monads cannot create monads. The monad is an acting centre into which its universe is mirrored. The perspective of its universe is determined by the monad from within and is self-contained. The monad is confined to its perspective, but in that perspective are the infinite monads. The monads within the monad's perspective are the reality of the monad's universe. The monad is both in-itself and for-another. In-itself it is subject of experience with its perspective. For-another it belongs to the universe of the monad in whose perspective it is.

Monadism means that reality is activity and not a stuff of which activity may be an attribute, quality or endowment. It denies substance as inert substratum, but affirms substance as active subject of experience. Monads are not a crowd with spatial boundaries, plurality is not mutual exclusiveness. The monad mirrors the whole universe and infinite monads are within the universe of the monad. Yet there are not an infinity of universes limiting one another. The monads all enter into and constitute the universe of every monad, but the perspective of one monad forms no part of the universe of another monad. The perspective of the monad is its in-itself-ness and incommunicable.

Monads are things-in-themselves, for in themselves they are subjects of experience. They know and are unknown, for to become known they would have to enter as objects into the experience of a subject, and in so far as they were objects they would cease to be subjects.

CHAPTER III

THE CONCEPT OF NATURE IN PHYSICAL SCIENCE

Henceforward space and time as independent things must sink to mere shadows, and the only thing which can preserve some sort of subsistence is a kind of union of the two.—MINKOWSKI.

MONADOLOGY seems to follow a direction in the search for truth the reverse of that which the mind takes in ordinary practical life and in physical science. This would be of little account were it not that in representing the inclusive character of reality the monad seems to undermine and even destroy the fundamental concept of physical science,—the notion of a physical reality independent of any mind and a common object for all minds. All distinctions fall within the monad and all relations are internal. The ego and the non-ego, the subject of experience, the "I" or "me," and the object of experience, the world or universe, are not brought together in the monad; they are not two existences united somehow in an act of knowing, they are one existence dissociated in the act of knowing. The relation subject-object is a relation of polarity, the existence of each term depends on relation. Subject and object are not therefore dual existences but a dual relation within one existence.

In physical science the objects which we apprehend are common to all minds. This indeed is what "physical" means. The objects of physical science are not tastes, smells, auditory and visual sensations, feelings of pleasure and pain, but the existences which give rise to these subjective experiences. And in physical science we regard these existences, however changing and unstable their appear-

ances, as independent of their relations to the minds which may apprehend them. If then monadology renders such a fundamental assumption *a priori* impossible, it would seem to be destructive of physical science in its inception and ground. This is not a problem we can set aside, and it is not a scientific problem ; it is a problem of philosophy.

Physical science is in no need of philosophy to justify its existence, or even to stamp its method with the hall-mark of validity. It is justified by its success, a success which is complete and unequivocal. The astronomer calculates the movements of the planets and predicts an eclipse, he can foretell the exact incidence of the shadow and define the time interval occupied by any portion of the event and to any required fraction of a second. All the astronomer's activity in calculating is dependent on the working of his mind, but the accuracy of his science depends on the absolute sense in which he can eliminate every subjective element from his object. It has come to be accepted universally that the success of science is due to this complete elimination of subjectivity, and that the possibility of such elimination is proof of the fact that there exists a common object which minds possess the power of apprehending. If metaphysical theory undermines or destroys this basis, it must furnish some ground of explanation of the success of science. I propose therefore to examine critically the scientific notion of physical reality. The notion itself, whether or not it be necessary as a basis of physical science, is not a physical but a metaphysical concept.

John Locke in the *Essay on the Human Understanding* makes frequent use for purposes of illustration of the embarrassment of an Indian philosopher who, questioned as to what supported the earth, replied an elephant, asked then on what the elephant stood, replied a tortoise, and when further questioned as to what supported the tortoise, replied, something or other he knew not what. Locke argues that the notion of substance as philosophers use it is this kind of explanation, it is an idea of something or other we know not what, which holds

together the sensible qualities of a thing and constitutes its thinghood. What impressed Locke was the necessity we are under to postulate something or other and the helplessness we experience in our effort to give this something any characterization. The illustration is more apposite even than Locke suspected if we apply it, not to the philosophical effort to form a notion of substance, but to the scientific effort to frame a positive notion of the stuff which ultimately constitutes physical reality or Nature. The history of physical science is a record of the continual displacement of one notion of the material basis of reality by another, each on its discovery claiming to be absolute and each in its turn finding that it must seek support outside itself. The Indian of Locke's story was not intended to denote some particular Brahmin, Buddhist, or other sage. Oriental philosophy was little known in Locke's time. The Indian of the eighteenth century was the ingenuous child of nature, the purely unsophisticated mind. He is Pope's "poor Indian of untutored mind," Voltaire's "l'Ingénu," and the humour lay in the simplicity and childishness of the imagery. What the story really illustrates is the fact that the human mind by an apparent logical necessity of thought continually finds itself compelled to form a notion of some existence other than the actual existence present to it in sense experience as the support and ground of sense experience, and then finds that it cannot give expression to its notion save and except in the imagery of that very sense experience which requires the extraneous support.

Thinking is interrogating. The mind asks questions about immediate sense reality, and the very possibility of asking questions supposes a reality which is not sensibly experienced. The essential nature of thinking, it has been said, is the distinction of the "that" from the "what." The "that" exists as present sense-imagery. The mind may accept the "that" without asking what, but then it does not think. There may be, that is to say, and we commonly suppose there are, grades of mind in which what we call "discursive" thought is absent alto-

gether, in which the creature lives entirely in the present without representation of the past or anticipation of the future. We usually picture the animal mind as more or less completely at this grade. Mind is essentially activity, but the activity may consist only in the simple expression of experience in immediate sense-imagery without any conscious reflexion or interrogation. But whatever may be the normal condition of mind below the human, and however content at times the human mind may be in the enjoyment of immediate experience, absorbed in a present attention to life, it is human nature to think, and thinking means that the mind sets the image over against itself and refers it to something not itself. Why it does so, wherein lies the necessity which disrupts immediate experience, we may leave aside for the present and concern ourselves with the fact.

The typical form of discursive thought is the question: What is that? The question implies that the immediate reality in the form of sense-image is not self-existent but an appearance whose ground is the reality. This something as the ground or cause or reason of the existence gives rise to the notion of physical reality. It is the idea of a reality outside the mind and independent of it, which manifests itself to the mind by a stimulus which compels the mind to infer it. The certain fact therefore is that every thinking being does, and must by the very nature of thought, suppose that there is a physical reality, a reality which is not a thought but something thought about, something independent of the thinking individual mind; a *somewhat* which explains the actual *that* which is experienced.

There are two philosophical theories of the nature of this physical reality. One is that it is an existence which the mind discerns by means of its sense experience and that our experience is experience of the sensible qualities of this existence. According to this view, whatever be the ultimate nature of physical reality and however inferential our knowledge of that nature, it nevertheless *is* independently of any act by which we come to know it. And also ultimately it is the ground not only of the knowledge of it

but of the mind which knows it. In knowing we discern, or make discovery of, what exists unknown.

The other theory is that this physical reality is a notion which is entirely a construction of the mind itself, a very complex construction, the result of a long and elaborate process. It is not a process which originates anew in each individual subject of experience. It has become through evolution a human heritage, taking in man the special form of intellect and being the human mode of activity.

Setting aside, however, any philosophical theory as to the genesis of the notion of physical reality, let us examine the nature of that notion itself and trace the variation of form which in the history of science it has assumed. We shall see that philosophers have not been more successful than the Indian who imagined first an elephant, then a tortoise, then something or other he knew not what.

It is clear that no one living our human life can ignore the obstinate facts which confront and environ that life. Life presents itself to us as a power of using what is the very opposite and antithesis of itself,—dead, inert matter. We shape and mould this matter to our purposes but we have no power to bring the least and weakest element of it into existence. It is there. It is indifferent to us, independent of us, and it seems as though life,—in itself a strengthless, feeble stream of tendency without support,—had, by insinuating and adapting itself, won the means of subjecting this inert mass to its service. It succeeds by what appears an incessant watchfulness and alertness, which if it fail for a moment is obliterated for ever by the dead matter. This matter, inert in itself, is swayed by resistless mechanical forces, consisting of the actions and reactions of blind unintelligent movements. This is the aspect of the world to the human mind, and the first effort of the mind when it reflects and becomes self-conscious is naturally and of necessity to form a clear and precise notion of this matter, which seems opposed to life and at the same time the necessary condition of the activity in which life consists. We find accordingly that historically the first records we have of pure philosophy are the efforts of men

who sought to think out precisely the nature of this physical reality.

A certain division or grouping of the forms of this physical reality suggested itself, we may suppose naturally, to the first reflecting observation. From very early times this physical reality seemed divided into four distinct elements—earth, air, fire and water. This classification, which now appears to us primitive and even childish, not only endured through ancient and medieval philosophy but comes right into the modern period. It is, in a general way, accepted by Descartes in his *Principles of Philosophy*, and its place in our language shows how rooted it is in our modern thought. We still speak of the " elements " when we wish to signify what we call in poetical language the untamed forces of nature. Moreover, it was observed that there is a certain opposition in the nature of these forms of matter so that one form is inconsistent with another, as, for example, fire and water. This notion is familiar to us in our expression " the warring elements." Hence when men turned their thoughts to the investigation of the nature of this " nature," which is opposed to mind and at the same time the sphere of its activity and the ground of its existence, two problems presented themselves. The first, what is the primordial stuff of which the elements are forms? And the second, what is and whence is derived the moving force?

We may single out four types of theory, each of which has for some time and during definite historical periods held sway and appeared to offer a satisfactory basis of physical science. They will repay examination and criticism, for each may be said in formulating a principle to have disclosed a problem which has led to the supersession of a theory previously held.

The four types of theory I propose to pass in review are: (1) the theory elaborated in the ancient philosophy of atoms and the void; (2) the rejection by Descartes of the vacuum or void and the theory of the vortex to explain movement in a plenum; (3) the theory of absolute space and time and infinite velocity (Newton); (4) the principle of relativity.

Every scientific theory of the physical basis of the material universe approximates to one or other of these types. I propose, therefore, to examine them as types, to criticize only what is the essential concept in each, and I shall not attempt to present them in their historical sequence, or with full detail, or to set forth the variety of forms they have assumed. I shall also of course completely ignore all criticism based on other than logical grounds.

The concept of matter, which is the basis of physical science, is not identical with the concept of substance in philosophy. Matter is the general idea of non-mental, space-occupying stuff. The doctrine that matter is itself the seat of efficient causality is materialism, and this is a philosophical doctrine. It is a curious fact that notwithstanding the overwhelming importance of the part which the concept of a physical reality plays in practical life, materialism is not a primitive, certainly not a natural and self-evident belief. Animism, the contrary of materialism, is more primitive and more universal. Materialism, in the pure or atheistical meaning, has always appeared late and not early in metaphysical speculation. It is also not a little curious that its condemnation by the popular judgment is always on moral, never on rational grounds. It has always seemed seductively rational, sometimes distressingly so, but it has also seemed to involve disastrous consequences in religion and ethics. It is in this connexion that rationalism is used as the synonym of materialism. Materialism seems to justify the maxim, "Let us eat and drink for tomorrow we die."

The atomic theory of Democritus was the first form in which materialism took shape. It furnished the metaphysical basis of the Epicurean philosophy. The most beautiful exposition of this philosophy is preserved for us in the great work of the Latin poet-philosopher Lucretius, *De rerum natura*. The stuff of which the objective world or nature consists exists, he tells us, in the form of separate particles, "atoms," whose size represents a limit of divisibility. The atoms are eternal and indestructible, identical in content, but diverse in shape, and movable by

external compulsion, forming by segregation and dispersion the variety and diversity of the elements. They are encompassed by the void. The void is a negation absolutely necessary to the affirmation of the atom, and deriving from this necessity a positive status. The void is not merely the logical opposite or negation of the atom ; it does not signify only the absence of an atom ; it is a positive reality. There must be a void as well as an atom in order that there may be an atom. But the void also performed a function of prime importance, it rendered movement possible. For suppose the void abolished, and the atoms everywhere in contact with no free surface, even assuming them still to preserve their atomicity they would be immovable. An unoccupied place in which to move is a condition of movement. If the space is occupied by atoms, the displacement of the surrounding atoms is a prior condition of the movement of any atom. An atom *before* it can move must displace the atom into whose place it is moving. If then there were no vacuum, and atoms formed a plenum, movement would be impossible. Moreover, as all the atoms are movable by external compulsion and are continually shifting, here condensing and there dispersing, the void, like the atom, is eternal and indestructible.

This argument is admirably set forth in the following quotation from Lucretius (I. 370-383) :

> Illud in his rebus ne te deducere vero
> Possit, quod quidam fingunt, praecurrere cogor.
> Cedere squamigeris latices nitentibus aiunt,
> Et liquidas aperire vias, quia post loca pisces
> Linquant, quo possint cedentes confluere undae :
> Sic alias quoque res inter se posse moveri,
> Et mutare locum, quamvis sint omnia plena.
> Scilicet, id falsa totum ratione receptumst.
> Nam quo squamigeri poterunt procedere tandem,
> Ni spatium dederint latices ? Concedere porro
> Quo poterunt undae, cum pisces ire nequibunt ?
> Aut igitur motu privandumst corpora quaeque,
> Aut esse admixtum dicundumst rebus inane,
> Unde initum primum capiat res quaeque movendi.

(And herein I am obliged to forestall this point which some raise, lest it draw you away from the truth. The waters they say

make way for the scaly creatures as they press on, and open liquid paths, because the fish leave room behind them, into which the yielding waters may stream ; thus other things too may move and change place among themselves, although the whole sum be full. This you are to know has been taken up on grounds wholly false. For on what side, I ask, can the scaly creatures move forward, unless the waters have first made room ? Again, on what side can the waters give place, so long as the fish are unable to go on ? Therefore, you must either deprive all bodies of motion, or admit that in things there is mixed up the void from which everything gets its first start in moving.)

The atomic theory, or what is better described as the theory of atoms and the void, held its ground practically unchallenged throughout the ancient and medieval philosophy. It was opposed, but not by disputing the nature of matter, only by challenging its self-sufficiency and causal efficiency. Those who opposed it did not offer criticism of the concept, but denied the eternity of matter, holding that it had been created and could be annihilated. It was the presumption of the atomic theory that nature in the form of atoms and the void was a reality which without contradiction could be conceived as eternal and indestructible, and this constituted, certainly for Lucretius, its main attraction. The object of his poem is to deliver mankind from the vain superstitions which torment it by showing that everything in nature can be explained without any necessity of supposing the intervention of the gods.

The effective criticism of the theory of atoms and the void is a main part of the philosophy of Descartes. It occupies a considerable portion of the *Principles of Philosophy*, and in fact furnishes the real ground of Descartes's theory that material substance consists in extension alone. It is impossible to exaggerate the importance of Descartes's criticism of the idea of void and of its supposed necessary function in supplying a condition of the possibility of movement. The whole subsequent development of physical theory may be said to hinge upon it. Yet it is strangely neglected. The once famous vortex theory is now passed over in most of the accounts of Descartes's philosophy, or treated as merely an archaic curiosity. This neglect is perhaps not difficult to explain.

It is due to the fact that Descartes is regarded as before everything else a speculative philosopher, and physics is regarded as peculiarly the business of the experimentalist. In the development of physical theory, therefore, we pass at once from Galileo and Kepler to Newton, and ignore the careful and elaborate work of Descartes, because it is confined, we suppose, to criticism of concepts and not to observation based on experiment. So far as the historical evolution of theory is concerned we are quite wrong. Some of the amazement we experience in regard to the simplicity and directness and magnificent comprehension of the Newtonian system is due to our ignorance of the profundity of the physical speculation of Descartes.

Descartes's philosophy, however speculative in the philosophical meaning of the term, that is to say, concerned with concepts as distinct from empirical facts, is in the fullest sense practical. His rejection of the concept of a void or vacuum is not based on the formal logical argument that the vacuum is the idea of nothing and that nothing is a pseudo-idea, for it is impossible that there can be an idea which is not the idea of something. He rejected it because if there be a void, action is impossible. That movement of any kind may be propagated from one body to another separated from it by any distance, some medium uniting them is essential. Action at a distance is inconceivable and also a contradiction of experience. I can only ring a distant bell if I pull the cord attached to it. How is such an action possible if the connecting cord be composed of atoms separated from one another by a void? In every case of an influence passing from one body to another there is some medium through and by which the influence is conveyed.

While, however, Descartes saw clearly that a void if it existed would be an impassable barrier destroying the possibility of action between bodies which it separated, he saw equally clearly the difficulty of movement in a plenum, the difficulty to obviate which the atomists had assumed the void. It was this difficulty which led him to formulate the famous theory of the vortex. The theory is that

movement in a plenum cannot consist of the *successive* displacement of the parts in movement. Such succession could never begin because the condition of the movement of one part is the prior displacement of the part which is to give way to it. Movement in a plenum is therefore only possible if all the particles composing it move simultaneously and are so interconnected that they form a complete system. If, for example, we have a system of atoms, *a*, *b*, *c*, *d*, . . . *z*, such that the movement of *a* involves that of *b*, this again that of *c* and so on to *z*, and if *z* completes the system so that its movement involves that of *a*; then, in this case, movement is theoretically possible but must be simultaneous throughout the series. Not only is a vacuum unnecessary but it would upset the mechanism. This is the simple scheme of the vortex, and Descartes applied it on a magnificent scale to explain the planetary movements, as well as to account for the mysterious phenomena of the loadstone.

The vortex is not a theory of the origin of movement in a plenum assumed at rest, it is a theory of the nature or constitution of a universe in which movement is actually existent, one of its characteristics. Descartes does not assume that matter existed originally as a compact mass and that movement was somehow imposed on it or set going within it. His argument is of the nature of an *a priori*. He points out the conditions of the possibility of what is an actuality.

The solar system is in this view a vortex and surrounded by other vortices which are the systems of which the fixed stars are the nuclei. The condensations in sun and planets are not solid concretions poised in vast empty space, they are centres of revolving movement, heavier and denser by reason of their lower velocity compared with the immense velocity of the ethereal elements of which the vast firmament is composed. Light he held to be a very subtile matter and capable by reason of its subtilty of stupendous velocity. He throws out the curious speculation that it is stuff formed and continually forming by the friction of the vortices moving against one another.

Descartes had no theory of the matter or stuff of the

universe. He accepted the old distinction of the four elements—earth, air, fire and water. What he did endeavour to deduce was the particular form of these elements from the movement of an assumed primordial stuff equally distributed. The substantiality of matter consisted only in extension, or what perhaps we ought rather to call extensity, for it is not geometrical space. The whole point of Descartes's argument is that wherever there is matter there is extensity—not the place where matter may or may not be, but the substance of matter itself. Where there is nothing there is no extension. Empty space is inconceivable, the notion of it directly contradicts the only idea which makes a mechanical propagated movement possible. Speculative as this argument is, it assumes exceptional importance in the light of our present physical problem, as well as for the part it has played in the historical development of physical theory. The hypothesis of the luminiferous ether is in fact designed to meet the very difficulty which Descartes had insisted on—the inconceivability of action at a distance.

Descartes's whole philosophy was in fact called forth and determined in its direction by the great discovery of Copernicus which had been published some half-century before his birth, and which in his time was revolutionizing the world-view and necessitating an entirely new reconstruction of human thought concerning the fundamental nature of our universe. The *eppur si muove* of Galileo is the real starting-point of modern philosophy. It is the historical fact that throughout ages mankind had supported itself intellectually on a theory now demonstrably false, which explains the whole Cartesian theory of clear and distinct ideas. Our senses not only are untrustworthy in the matter of truth and error, they are not only liable to deceive us, but the whole of our practical life is based on the deception, wrought in us by the senses, that the moving is at rest. It is clear then that it is not to the senses we can turn for our criterion of truth, they must serve a lower and utilitarian purpose. Truth is not based on psychical certainty but on principles which are only discerned by an intellect free from the distractions of sense. It was

the Copernican discovery, moreover, which set the problem : Is movement the vacating of a position ? When a material substance moves does it leave behind a void ? Or, is movement a change of neighbourhood of material substances relatively to one another ? In declaring that material substance consists in extension alone, Descartes rejected the notion of a void within which things move and of atoms as indivisible particles occupying an infinitely divisible extension. Material substance is extension and extension is not distinct from it ; it is not a void expanse spread out beneath it. The physical universe is a plenum, and all movement within the plenum is relative change of neighbourhood. To be at rest is to be within a system in which the objects retain to one another their relative position, although the system itself may be in movement of translation relatively to other systems. In this way the new world-view was rationalized. " The earth is at rest," said Descartes, " in the same sense in which I am at rest in the cabin of the ship which is transporting me from Calais to Dover." It was therefore the new world-view which absorbed the attention of Descartes, and which has made the profound difference between the old philosophy and the new.

Descartes's brilliant physical theories, however, suffered complete neglect when the scientific world came under the influence of the great mathematical and physical work initiated by Newton. It seemed that then a new method was found and a new era opened, promising an unlimited extension of the science of nature. Newton discarded all dialectical arguments, and refusing to be turned aside by any problems of *a priori* possibility, set to work to study minutely the facts as they lay before him and to measure them. " Hypotheses non fingo," he wrote at the close of his *Principia*. He took for granted that facts are what they purport to be, or rather he never allowed doubt on the question to disturb him. This attitude towards nature has now been adopted as the distinctive basis of the physical sciences. We have indeed to recognize that only by assuming the subject-matter of the sciences can we have any sciences, for if we insist on raising the previous

question we cannot begin. Newton, then, described the universe as it presents itself to a human mind contemplating it, and he sought to determine and fix in clear mathematical formulae the laws of its phenomena. Space and time and movement were therefore for him accepted facts, not problems. The framework of nature is an absolute space, an even flow of time fixing an absolute succession of events, and movement, the translation of matter occupying a position in space through adjoining positions at successive moments of time. Space might be occupied or unoccupied but could not be annihilated, time was absolute and unalterable, and movement was capable of an infinite acceleration. The framework of the universe is therefore an infinite and absolute space, and an infinite and absolute time, and consequently an infinite velocity. Movements of translation and propagation and in fact all physical phenomena which involve movements were therefore expressible in equations of velocity, of which space and time are constants.

What is continually surprising us in the study of nature is the discovery that its actual processes, detected by scientific observation and experiment, are so entirely contrary to what seems the obvious mode of their working. How difficult it is to-day, now that we have become familiar with the sight of people riding bicycles and able to control perfectly every deviation of the movement, to realize how incredible was the notion of its practicability fifty years ago. With what painful timidity we witnessed its first practical demonstrations! A most curious source of quite a number of illusions in regard to the movements which form part of our daily experience is an apparently natural induction, a false inference, to make which seems part of our human nature. The head which we hold erect is by far the heaviest portion of our bodily organism. We maintain its position by a continual expenditure of muscular energy, but of this expended energy we are entirely unconscious, and because of this unconsciousness we act continually and perform purposive movements under the conviction that our head is the lightest portion of the

framework. Were it not for this illusion, and were it not for the difficulty of overcoming the tendencies and habits created by the illusion, the well-known difficulties in acquiring the art of bicycle riding, swimming, skating, even tight-rope dancing, would be non-existent. It is simple facts like these which show us that common experience is not self-explanatory and which make scientific experiments appear so paradoxical in their inception, so revolutionary in their effects. The story that a falling apple raised in Newton's mind the question which led to the formulation of the law of gravitation may be apocryphal, but it illustrates the principle. Our nature is an equilibrium between an activity served by consciousness and able to be purposive, and an environment. Mental apprehension of this environment is practical, not theoretical. Familiarity is not identical with, nor a substitute for, scientific knowledge.

Take, for example, Newton's first law of motion,—the *vis inertiae*, the force or power in matter to persist in any given state, whether of rest or of motion in a straight line, and to resist any external force impressed upon it to change that state,—in its two particulars it is the direct reverse of what common experience appears to us to establish. Yet it is not based on speculation but on careful observation and experiment. A moving body goes on moving till some force stops it, and a movement set free from a controlling force takes immediately the direction of a straight line. The cricket ball when it leaves the bowler's hand goes straight, it has taken no curve in its direction from the swing of the bowler's arm. The stone released from the sling does not follow the circular movement which gives it momentum, it flies off at right angles in a straight line and is drawn to earth by the curve of the force of the earth's gravity.

Newton assumed the framework of nature. The mechanical forces which he observed for the purpose of determining the laws of their action were viewed as free to act within a sphere fixed for them by absolute space and time. By regarding space and time as constant factors of the situation he was able to determine the laws of motion.

The equations which he formulated are adequate for all ordinary velocities, that is, for all movements which are under our control in practical life. It is only in regard to the immense velocities which modern science has brought within our view, velocities which approach that of the propagation of light ten million miles a minute as compared with the earth's translation ranging round 5000 miles a minute, that the equations fail.

The difficulty which we meet throughout the whole development of physical theory is concerned with motion. How are we to conceive the ultimate constitution of the matter which seems to be necessary to support the reality which confronts us as nature, so that it shall not be inconsistent with the free movement of the masses, and of elements within the mass? The translation of masses and the continual transformation within the mass by internal change are undoubted facts of experience. How frame an image of a constitution consistent with motion and change and so render possible the determination of the laws of movement and change? Newton found all the necessary conditions in space and time. Taking these as constant, movement could be expressed in the terms of a ratio between them. As they were infinite, so an infinite acceleration was conceivable. Infinity, so troublesome to common sense and philosophical reflexion, did not trouble him. Could any one doubt that God is infinite? Space and time are the sensorium of God, parts of his infinite nature.

The Principle of Relativity marks a revolution in the concept of the nature of physical reality which can only be compared in its completeness with that which followed the Copernican discovery in the sixteenth century. It can be simply stated. The Newtonian measurements took space and time as constants and velocity as variable; the principle of relativity takes velocity as constant and space and time as variable. It seems, and indeed it is, contrary to our ordinary notions, but it is not paradoxical. It is often denied that any metaphysical concept is involved in it and held to be of purely mathematical importance, a question only of convenience in the method of measuring

phenomena. It is becoming increasingly evident, however, that the principle of relativity is based on a real fact as to the nature of physical reality, and therefore that it corrects a false notion and replaces it with a true one.

Descartes pointed out that when we push off a boat from the shore we invariably express the fact by assuming that only the boat moves and that the shore is at rest, whereas it is just as true that the shore moves and the boat is at rest. The movement in fact is relative, and may be measured by taking either boat or shore as at rest and the other as having moved, but the calculation required in one case is infinitely more complicated than it is in the other. It is practical convenience in this case, and not physical fact, which determines our choice. The child's riddle, " Why did Mahomet go to the mountain ? " derives its point from our invariable habit of representing physical objects as immobile and living objects as mobile. A philosopher's answer that the same fact could be equally truly described in terms that the mountain went to Mahomet as in terms that Mahomet went to the mountain would seem pure nonsense to the child.

Many other modes of judgments which appear to us as invariable are merely conventions. Thus a distant object appears small and its visual image grows larger as we approach it. The doubt never disturbs us that the change may be in us and not in the image, that in approaching the object we may be shrinking to smaller proportions. Yet the phenomenon could be explained just as perfectly in that way. We may suppose that the good genius directing the evolution of our species has settled the matter for us and not left it to choice.

There are many interpretations of common experience which are alternative modes of explaining phenomena and which in themselves do not disclose the principle which has guided us in our choice. We look around us at the room in which we are sitting and we judge that it contains so and so many cubic feet of extension or space, and we think of this space as unalterable. When we translate this into terms of our experience it simply means that with a certain expenditure of energy it will

occupy us a certain definite time to pass from point to point within it. Suppose that a strange and surprising experience should occur, that we should find our expectation not fulfilled, but that expending our accustomed energy we had to take as many strides and as long a time to cross the room as to go a mile along a road. We should feel ourselves the subject of a strange illusion ; how should we describe it ? It is easy to see that we could describe it in either of two ways. We could say that the walls of the room, which we had in our old experience found to be a few feet apart, were now a mile apart. Or we could say that our movements, which previously had seemed rapid, now appeared to be laboured and slow. This means that it would be perfectly indifferent so far as the fact was concerned whether we took space and time as constant and our velocity as variable, or our velocity as constant and space and time as variable. But we need not go to fanciful experience for our illustration, we can take it from historical fact. In the Great War an army of millions was transported from America to France in less time than an army of thousands could have been transported from England to France a hundred years ago. We can express this fact by saying that we live in a smaller, less spatial or more contracted, world than our forefathers lived in, or that we move more quickly in it. We are not accustomed to take space as variable, to do so seems to go athwart the whole mode of our intellectual behaviour, but so far as pure experience is concerned the fact is the same, and we can express it either way. Is it then purely indifferent which we do ? No. We are all now familiar with the famous experiments and astronomical observations which have made it appear certain that space and time are in reality variable, and that it is not merely a question of convenience whether for the purposes of measurement we regard them as being so or not.

All our methods of measuring physical phenomena depend in the last resort on light signals. They are practically instantaneous. We know that the propagation of light is not actually instantaneous, it occupies time, but the velocity is immense when compared with the velocities we

are familiar with in the movements of matter, and the time interval between the emission and reception of a light signal for any two points on earth is infinitesimal and practically inappreciable. We could never have discovered this velocity by observing purely terrestrial phenomena. We know it because our observation extends far beyond the limits of our planet, and it becomes not only appreciable but substantial for the immense distances of the fixed stars, and it serves us as a means—our only means—of computing these distances. The actual discovery was made by Roemer in 1675 from observations of Jupiter's moons. So far as terrestrial phenomena are concerned, we can measure a distance accurately by transmitting simultaneously a light signal and a sound signal, and recording the time interval which separates their reception. If we had in our experience the cognizance of any force which would propagate a movement with greater velocity than light, it would enable us to appreciate the interval of light transmission, but we have not.

Velocity is not self-explanatory. It requires a scheme ; for it is a ratio between distances traversed and time taken. It therefore supposes space and time. The scheme of the physical universe, which our experience of external reality demands, comprises (1) Space of three dimensions, (2) Time with one irreversible direction, (3) Matter or mobile mass, and (4) Energy or transmissible force. There is a vast gap between the velocities of the movements of matter when a mass is transported and the velocities of energy transmitted without translation of mass. It is easy to see, therefore, that if the scheme of an absolute space and time were a true representation of the framework of the reality of the physical universe, if, that is to say, space and time were constant and invariable constituents and if velocities were capable of infinite acceleration, then strange and disconcerting phenomena would occur when velocities of translation approached and overtook the velocities of transmission. Suppose, for example, that the stellar system of which our solar system is a member were itself moving through space at the velocity of light (it is conceivable and may actually

be so from the view-point of some system of reference), what ought the effect to be on us dwelling on a planet revolving round the sun? We depend on our sun for our utilizable energy in light and heat, but we should find ourselves wholly deprived of any supply during the six months when the earth would be in advance of the source, for we should be in translation of greater velocity than the emitted light, and during the other six months, though the earth would be behind the source, it would be receiving light which could not be reflected. This appears extravagant, but it is always useful to take the limiting case as the example. Are we justified because this conjectured experience is not actual in denying the supposition? Can we, in other words, on the basis of this argument, of what would occur in the circumstances supposed, set limits to the velocity of the movement of translation of our system? There is an alternative and this is offered to us in the theory of relativity. The alternative interpretation is that the velocity of light is constant, invariable and independent of the movement of the source, and that space and time are variable. Every movement of translation of the source of light is automatically compensated in a shrinkage or an expansion of the space and time co-ordinates.

Have we any means of deciding between these alternatives? The answer is that it has been possible to devise experiments, and that the result of them is overwhelmingly decisive in favour of the principle of relativity. The historically important experiment which led to the formulation was made by Michelson and Morley in 1886. The earth in its annual revolution round the sun is carried through space, and we can therefore represent this space as an ether stream flowing past us, and every six months the direction of this stream is completely reversed. It is of no consequence what theory of the hypothetical ether we hold; ether is the name of the medium, space or something occupying space, through which light is transmitted. An instrument was designed capable of detecting a variation of one-millionth of the velocity of light. The effect of the ether stream to be measured was

at least 100 times greater than this. A beam of light directed on equidistant mirrors, one in the direction of the stream, the other across the stream, was reflected back to the source. The ether stream should have retarded one of the beams, producing an interference fringe, but the expected result was not obtained. The ether stream was shown to be without effect on the observed velocity of light. Presuming the accuracy of the experiment, and this is not questioned, and moreover has had independent confirmation, the result is decisive for theory. It has demonstrated the constancy of the velocity of light to an observer in a moving system, and as the variation due to the ether stream must be accounted for, the only possible conclusion is that the space and time of the observer accommodate themselves to the constancy of the velocity. There is no need here to follow out the development of the theory, to describe the work of Einstein and the formulation of the general principle of relativity, which extends to gravitation and to all the laws of nature. The scientific concept of the nature of physical reality is not an absolute existence independent of mind, but a co-ordinated framework relative to the observer.

The significance of the new theory is not in the revolution it has occasioned. So far as physical science is concerned, it is no more disconcerting to treat space and time as variables than it was to treat the earth as moving when the Copernican discovery showed that the common-sense theory of a geocentric universe was untenable. The two cases are exactly analogous. The adoption of any scientific basis of reality is to some extent arbitrary ; what drives us to it is not obstinate fact but convenience. The principle of relativity is adopted because it is more convenient. It is true indeed that the new principle extends the range of mathematics, also it reconciles some puzzling discrepancies between astronomical calculation and fact which were not due to error. The true significance of the theory is only seen, however, when the whole historical evolution is taken into account. It is the recognition that it is impossible to co-ordinate the physical universe without taking into

account the observer's standpoint. It marks the introduction into science, and full recognition of, a monadic principle. The observer in a system in relative translation in regard to other systems measures his universe from his own standpoint by three dimensions of space and the one dimension of time. These dimensions are not constant; they vary with the acceleration and direction of the translation of the system, and by their variation velocities are kept constant. This is a new world-view.

The universe consists of events, and these events are co-ordinated by the observer so that a constant ratio between space and time is maintained. Space and time vary, therefore, with the system of reference, and ultimately every observer is the unique centre of his own system of reference. There is therefore no objective scale by reference to which magnitudes can be assigned an absolute value. Great and small are relative terms. We all recognize the constancy of velocity when we compare the range of activity of a human being with that of other living creatures. For as an insect's world is smaller than ours and a bird's world more extended, we must imagine each creature to co-ordinate its world on a scale of its own and not on ours. But the world-view which science now presents to us enables us to apply this principle of the constancy of velocity on an infinite scale. Physical science, in fact, presents to our view a universe which is as amazing in its limitations as it is infinite in its vista. At one of its limits, above us, as we say, is the stellar system, and at the other limit, below us, as we say, is the atomic system. These bound for us the scientific horizon, but they are not indefinite limits indicating an obscurity into which the mind can penetrate no further. They are clear systematic, inclusive concepts which give to our universe the character of an objective, organic self-repeating design. The planet on which our life has evolved appears to our imagination as the electron of a vastly magnified atom, and the atom is a solar system shrunk to infinitesimal proportions. The principle of relativity shows us that this great and little are not absolute magnitudes.

The infinitely great becomes infinitely little when the observer changes his system of reference. Shrunk to the proportions of the atom, the electron of the physicist becomes for the observer a planet revolving in its orbit round a sun, and we have only to imagine a being of Olympian proportions and the necessary range of activity to see earth and sun and stars dwindle to atoms. Whatever change the new system may introduce in the quality of experience the proportions will remain the same. Such is the significance of the constancy of velocity in the principle of relativity.

This brief outline of some of the distinct stages in the evolution of the scientific concept of physical reality is intended to emphasize the impossibility of separating scientific and philosophical development. At one time the fashionable theory was that science had superseded philosophy. It was declared to mark a new era, a definite progress in human reason and a new stage in freedom from mental bondage. The old mythological and theological stage had been replaced by a metaphysical stage, and now in modern inductive science, it was said, a new positive stage had come to supersede the vague and unsatisfactory speculations of philosophy. A mere glance at the historical connexions shows how shallow this judgment was. To-day it is impossible to ignore the claims of philosophy, but it is usual to accord it, often grudgingly, a place of subsidiary importance, dealing with subjects altogether distinct from the sciences, and not possessing like them a sure basis in physical reality. But history shows us that the supposed clear lines of demarcation are arbitrary and false. Philosophy depends on the world-view. Modern science and modern philosophy arose together when the heliocentric discovery altered the world-view. At every stage the speculative or large view of the philosopher has acted and reacted on the analytical and experimental research of the scientific investigator. For a long time indeed the methods seemed to diverge, but to-day we are witnessing a remarkable approximation. The approximation is due to the recognition of the monadic principle.

CHAPTER IV

THE CONCEPT OF NATURE IN PHILOSOPHY

Whose is this image and superscription ?—St. Matthew.

It is as certain as any scientific truth can be that this earth existed ages before there was any conscious life upon it, and that it will continue to exist ages after its condition shall have rendered life impossible in any form of which we have experience. It is true that to present this existence to the imagination we are dependent on sense-imagery, we can only represent it as potential consciousness, but this does not affect our confidence that something has existed, does exist, and will exist, independently of whether any cognitive being has existed, does exist, or will exist to know it. The classical arguments of the idealists leave us cold. We may hold with Spinoza that extension is a mode of the infinite substance, God ; we may believe with Fechner that there is a world-soul expressing itself in the physical universe ; we may find satisfaction in the idea of a spiritual absolute, an ultimate harmony, in which the contradictions and antinomies of temporal existence are reconciled ; but the main fact of our conscious being seems to be our relation to an externality which, whether or not it is dependent on spirit, is itself non-spiritual.

The aspect of nature as indifferent and hostile to spirit is as prominent a feature of the old world-view as it is of the new, and it finds abundant expression in ancient literature, but the new world-view has given it new embodiment. The modern scientific concept of physical reality has made practically impossible the direct and easy solution

offered by the old world-view in the theory of special creation. We may still believe that the words " In the beginning God created the heavens, and the earth " are philosophically true, but we can no longer refer them to a definite temporal event, however far back in time we remove it. We can only smile at the serious mood in which the seventeenth-century philosophers disputed concerning the nature of the creative act. " From the beginning," wrote Leibniz, " God has made each of these two substances (the soul and the body) of such a nature that merely by following its own peculiar laws, received with its being, it nevertheless accords with the other, just as if there were a mutual influence, or as if God always put his hand thereto in addition to his general co-operation." It is quite impossible for us even to conceive the creative act which should bring the world into being, and we no longer seek the answer to our problem by reasoning about its nature or trying to fix its date. And this means that for us the concept of God has changed with the world-view, and as completely. It does not mean that our philosophy is atheistic, for the old atheism is as impossible as the old theism ; neither touches the fringe of the great problem which the new world-view has disclosed. With the geocentric universe has gone the idea of the artificer and the analogy between the skilful contriver of a perfect machine and the architect of the universe, but the essential problem survives in a new form. Let us look at that problem.

One of the most magnificent expressions of the aspect of nature as a sublime and awful force, indifferent to man, however completely subject to higher spiritual powers, is the Book of Job. It begins with the drama in heaven where Satan appears among the Sons of God with the sequel of the great fourfold catastrophe which leaves Job desolate. We are told that " Job arose, and rent his mantle, and shaved his head, and fell down upon the ground and worshipped ; and he said, Naked came I out of my mother's womb, and naked shall I return thither : the Lord gave and the Lord hath taken away ; blessed be the name of the Lord." In these words we seem to have the agonized expression

of the burden of the human mind contemplating its brief period of individual existence. We come naked into a strange world, are buffeted by a fortune we do not control, make what we can of our life, and finally sink again into the eternal oblivion out of which we arose. The world into which we have come existed before us, will exist when we are gone, is independent of us and indifferent to us. We exercise indeed some brief authority, we experience joys and sorrows, but the world confronts us as an existence in relation to which our life is nought. We may possess goods, we may create values, but all these belong to the world, they are external to us, they are no part of our real life. It is an already-made world into which we come at our birth, and from it we shall depart at our death, leaving hardly a trace upon it of our activity during our brief sojourn. Such is one aspect of our human life.

There is another. There is a sense in which we do not come naked into the world but bring with us our heritage. This heritage itself has two aspects—it is an endowment and it is a burden ; it is an impulse to strive and a vantage-ground in the struggle ; it is a task-master bending us to a circumscribed range and it is a hostile force crushing and thwarting the free activity of spirit. This aspect of nature is abundantly illustrated in poetry and religious literature.

> Our birth is but a sleep and a forgetting :
> The soul that rises with us, our Life's Star,
> Hath had elsewhere its setting,
> And cometh from afar :
> Not in entire forgetfulness,
> And not in utter nakedness,
> But trailing clouds of glory do we come
> From God, who is our home.

But it is not only clouds of glory which we trail. The whole burden of our human nature is borne along with us as our heritage. All the generations from the beginning (a beginning which can have no absolute meaning for us) are gathered up in the generation of individuals who at this moment by their activity constitute living humanity, and this generation will impart to the succeeding one both the

impulse of its present life and the accumulation of its inherited past.

It is in the mythical form which it has assumed in Christian doctrine that this aspect has become most familiar to us. It is the concept of original sin, which forms the basis of the scheme of redemption. It is brought out with peculiar force in the Pauline writings: "That which I do I know not; for not what I would, that do I practise; but what I hate, that I do." "For I know that in me, that is, in my flesh, dwelleth no good thing: for to will is present with me, but to do that which is good is not. For the good which I would I do not: but the evil which I would not, that I practise" (Romans vii. 15, 18, 19). And the conflict found its explanation, in the Christian scheme, in the mythical history of the first man Adam and his fall. "For as in Adam all die, so also in Christ shall all be made alive" (1 Cor. xv. 22).

Thus there arises before the reflecting mind a new and different view of nature. Nature possesses in itself that essential activity which characterizes mind. It is no longer a garden which God has planted, a place prepared, an environment in which life can exercise its activity and consciousness arise, it is now an active force, an opposing force indeed, but at the same time essential to the force it opposes. This aspect of nature as a hostile force, a reality with which the spiritual life is in necessary conflict and also in a necessary relation of dependence, is not a purely subjective aspect. It is not mythology, expressing itself in poetry, concealing such truth as it contains in metaphor, concerned only with a contemplative mood; on the contrary, it is as distinctly scientific as the physical theory which resolves all existence into the velocities of electrons. It is the aspect which nature presents to the biologist, for whom reality is history and present existence a stage in a universal conflict. The struggle for existence has acquired a technical meaning in the evolutionary theory of the origin of species, but in a profound and universal sense life itself is a struggle. Into the very notion of it there enters the opposition of a structure, dependent on

an inert matter, and a function, dependent on a developing purpose.

There is yet a third aspect of nature, which finds expression in poetry and religion. It is even more comprehensive, more significant and profounder than the other two, for it indicates a concept which embraces and harmonizes them. Nature appears to us as a moment in the developing life of spirit, and therefore as itself spiritual even in its antithesis to spirit. The conflict and opposition which characterize it are a necessary condition of the activity on which mind, as a concrete life, depends. Nature therefore is comprehended within a higher unity, and owes its reality to that inclusion. This aspect is expressed with great beauty in the Johannine writings and it is the rational ground of the Christian doctrine of the Trinity. "In the beginning was the Word, and the Word was with God, and the Word was God. The same was in the beginning with God. All things were made by him; and without him was not anything made that was made. In him was life."

In the doctrine of the Trinity the philosophical principle is barely concealed beneath its mythological expression. The procession of the three persons—Father, Son and Holy Ghost—is not a process in time, it is a figurative representation of the principles which are the condition of time process and which are not themselves temporal but eternal. Reality conceived as simple being is indistinguishable from its opposite nothing. For being to manifest itself as being it must do something, it must act, it must change or become. But the concept of change or becoming is the concept of a difference or otherness which is identical with the being from which it has proceeded. The concept of activity cannot therefore be expressed except in moments; in the first moment it is a bare identity, in the second a polarization or internal opposition, a contrast of positive and negative, of mind and nature. The third moment is the action or deed or event which is the reunion of the other in the self. The third moment is that of the concrete reality. We owe to Hegel the explicit exposition of this principle in modern philosophy. Whether or not it was suggested to him by

the Christian theology, the doctrine of the Trinity is made rational in the light of it. It is easy also to interpret the Christian theory of Redemption as further setting forth the principle. Evil is rebellion. It is no other than the self-assertion of the negation in the second moment and the imperfection implied in it. This must be overcome by union with God in the higher concrete reality—the City of God; and this is the work of the Holy Ghost. We, being ourselves individual centres of activity, view nature in the moment of its most complete opposition or estrangement.

Hegel, in his zeal and enthusiasm for the philosophical view of nature as a moment in the development of mind, unfortunately took up a hostile attitude toward physical science, and heaped contempt, not unmixed with vituperation, on its votaries and their methods. He proposed a philosophy of nature as a substitute for physical science. In this way he not only raised opposition but positively obscured the true greatness of his own concept. He is chiefly responsible for the estrangement between philosophy and physical science, an estrangement particularly marked in the great advance of scientific discovery in the nineteenth century. It is one thing to protest that the physical sciences are not philosophy, another to deny them their place in the activity of mind. Hegel was dominated by the idea of totality or concreteness, the sciences are dominated by the idea of analysis, and they tend ever to minuter divisions. For the sciences reality is essentially discrete. Hegel saw the impossibility of attaining reality by a piecemeal method. He held it an absurdity to suppose that the fundamental reality is to be found in the most attenuated abstraction. He failed to see that the strength of science lies in its method and therefore in the abstractness of its subject-matter. Rightly understood, this abstractness is the value of physical science and not a reproach against it.

The philosophical science of nature is named cosmology. Its subject-matter is identical with the physical reality of the sciences, but its task is not to study it in their manner, nor with their purpose, but to make explicit what is implied

in the notion of an external world and what is its relation to life and experience. This is clear when we compare the criterion of science with that of philosophy. The aim of all physical science is practical, however remote its application may be. We know the nature of anything when we can foretell what its state will be under given conditions. Practical convenience and the needs of action govern us in our selection of material, in our organization and arrangement of the sciences, as well as in our assumptions regarding the scheme or framework of physical reality. Cosmology, on the other hand, critically examines the concepts which science assumes or postulates—the uniformity of nature, the unity of the world, the concept of a universe, the reality of space and time, the concept of existence, the relation of reality to ideality.

The first view which is presented to us when we make the universe the object of our thinking is that of its antithetical nature in relation to the mind which observes or contemplates it. Nature presents itself to mind as a different realm. Mind has no control over nature in so far as existence is concerned. It may direct its forces but it can bring nothing into existence. This aspect of nature leads to the view that mind in its act of knowing contemplates an alien existence and that the essence of its activity in knowing is discernment. We cannot in our individual life abstract from this view. Every individual mind by the act of knowing experiences itself as subject in relation to an object which as known confronts it as an alien external thing. Also every individual mind as subject knowing is in a relation of inter-subjective intercourse with other minds or subjects through the medium of external objects common to it and to them. We regard nature therefore as a world of objects distinct from our mind and from other minds also. This world confronts us and is a common world for all minds contemplating it. In practical life this view admits of no doubt, the very possibility of action consists in taking it. The image of a "nature" opposed to "mind" is not an arbitrary assumption or postulate which any one deliberately makes, neither is it a necessary inference we con-

sciously make. It is the basis of action, a necessity of the practical life. When, however, we examine critically the belief it implies we meet a formidable difficulty. All that is immediate in experience is in relation, and though we may distinguish the relation from the terms, and the terms from one another, we cannot infer from a distinction in knowledge the separate existence of what we have distinguished. We cannot affirm the independent existence of the terms, for in their independence it is impossible to experience them. When I know anything the object is always object in relation to a subject, and I in knowing an object am subject in relation to object known. Neither subject nor object can be known apart from the relation. It is this fact which gives rise to the problem of philosophy concerning the relation of thought to reality.

Our ordinary view is then that a reality distinct and separate in its existence from ourselves is present to us for our contemplation, and that we, by virtue of our constitution, are fitted to, and actually do, by sense and understanding, discern its true nature, apprehend it as it is. We think, moreover, that this identical reality is present to all minds alike, and that what difference there may be in apprehension is due to the subjective individual point of view and in no sense whatever to the reality present. Few indeed would hesitate to accept this view, and many are surprised when it is called in doubt. It seems a paradox to affirm that it is absolutely inconceivable that it can be true, yet this is the view to which philosophical reflexion brings us.

In order to see this let us make the hypothesis that it is true ; that is, that nature in its existence is what it appears in our knowledge, and that knowledge is a simple relation between two real existences which are present together, one of which being a mind contemplates the other. Let us raise no question as to the *a priori* possibility of such a relation, but accept it as description of fact and assume it to be ultimate fact whether explicable or not. Let us ignore too the classical difficulty of all naive realism, the difficulty of accounting for illusion and error. Let us look only at the problem presented by the need of delineating clearly to

which of each of the two realities, mind and nature, is to be assigned the existence which knowledge reveals. This leads us to the great cleavage in philosophical theories.

Nature is not a chaos but an order. It is revealed to us as a unity, but this unity is not the unity of an individual experience; on the contrary, nature is not one but many; its unity is a uniformity. In itself it seems to consist wholly in external relations; that is, the character or quality of any part, or of any particular component object taken for convenience of analysis, resolves itself always into the relations in which it stands to the other parts or to other objects. Yet all these relations are founded in and flow from a necessary systematic unity of the whole. Is this unity discerned by the mind in nature, or is it imparted to nature by the cognizing act? According to one view the mind is passive or receptive so far as the whole content of cognition is concerned. It receives "impressions" from an independent external world. Its activity consists only in attention and discernment. The unity of nature is an inference we draw from the uniformity which we observe. According to the other view mind makes nature. It does not receive impressions, but itself impresses sensible experience with intelligible form, moulding, fashioning, and so creating, things. The unity of nature is the necessary consequence of the mind's activity in framing experience with the categories of the understanding. The two views are historically famous; the one is illustrated in the philosophy of John Locke, the other in that of Immanuel Kant. There is a third alternative presented in M. Bergson's theory of matter and intellect in *Creative Evolution*, one which on the assumption of dualism avoids the impasse of each of the antithetical views. It is that the unity of nature belongs exclusively neither to nature nor to mind, but consists in the mutual adaptation of one to the other. Intellect and matter do not stand to one another in the relation of cause and effect, and the question, which is cause and which effect, therefore, does not arise. Both are determined in their form by the life-impulse. A condition of action is an original dichotomy of mind and nature, and evolution has created the forms of

living action by mutual and progressive evolution of these two factors.

This last theory has the great merit that while it recognizes and does not seek to explain away, or reduce to unity, the imposing fact of duality; while it regards the duality of mind and nature as absolute in fact as well as in theory, in existence as well as in idea; it yet bases that duality on a metaphysical principle and derives it from the unique concept of the vital impulse. The unity is not a state which precedes either temporally or logically the duality. Rather the unity of mind and nature may be said to consist in their essential and necessary duality. It is not an original unity succeeded by a disruption destructive of the unity, it is an ideal unity without beginning or end. It characterizes the process itself, not a stage of the process.

If we accept this view it is to the concept of living activity we must turn for light on the problem, because there only do we find intellect and matter in an essential combination. Each of us is in himself a centre of living activity, and the easiest approach is to direct our study on the self, which is the individual subject of experience. I, who feel and will and think and act, find in myself those two orders of existence, mind and nature, in intimate and indissoluble union. In this union I cannot confound the two orders—in practical life I never do—and I cannot dissociate the unity. My mind belongs to a spiritual order, my body to a material order. My body is part of the external world, and while it is separated from the rest of the world within which it is an object by the perfection and completeness of the individuality of its systematic organization, it is yet continuous with the world and owes its efficiency entirely and exclusively to this continuity. My mind is not part of the world in which my body is an object, yet it is completely separate in its individuality as a subject of experience from other minds who are subjects, and at the same time continuous with them in its intercourse. As a life, a living thing, thinking mind in acting body, my self or ego has a definite period of individual activity, closed by the time-limits of its birth and death, completely separate from other lives, yet continuous

with all other lives, present, past and yet to be. It is the outcome of past lives and is what they have accomplished; it is the potentiality of future lives, and it is continuous even in the present with other lives, for its relations of sex, of family, of community, of humanity, are the essence of it.

The fact I wish to emphasize is that in the actual individual agent the two antithetical orders are impossible to confuse, and impossible to dissociate. They cannot be confused, for who can confuse thoughts, feelings and desires with muscles, nerves and blood-vessels? They cannot be dissociated, for apart from one another there can be neither meaning nor efficiency. We can only describe the material order in terms of the mental, and we can only exercise agency by the instrumentality of the material. With this fact that every living agent is a unity in duality and a duality in unity is bound up another fact. Each of the dual orders united in the agent reaches out beyond the individual, so that on each side of his dual nature he is continuous with a reality which transcends his individuality. My body relates me to the physical world in which it is an object, my mind relates me to the spiritual world of which it is a member. Clearly it is this continuity of the two orders, outside and beyond myself, which causes the world to present itself to me as something in itself, something in no way dependent on my mind. Also because my efficiency appears to lie wholly in the order to which my body belongs, my mind appears to me as something passive or receptive, wholly dependent on its relation to the order of nature.

My activity as a living agent is seen therefore to rest on a twofold nature, or on a nature which combines a twofold order. I have a body which carries out in action what my mind projects in idea. My activity is twofold in its character, it is first theoretical and secondly practical. In my individual experience neither character exists nor can be thought of as existing independently of the other and for itself. The frequent attempt to present in imagination a disembodied spirit always fails; we find that try how we will to imagine pure spirit we must borrow imagery from the body. Yet, notwithstanding this defect, the concrete-

ness of the reality of my individual life appears to me as a result of composition, and the two components seem not merely distinguishable but separable. On the independence of thought and action my feeling of freedom in the exercise of choice is based. My power to choose is dependent on the presentation of alternative courses in idea which may be rejected or carried out into action. Since in every particular case of choice I separate the idea from the action, it seems to me that the whole of my ideas, the complete mental order, may be separate from my actions and therefore from the material order. My whole theoretical activity seems independent of my whole practical activity. But even when this appearance is reconciled there is another which is more especially responsible for the concept of nature as an independent, alien and even hostile existence.

My body encloses within its skin an object which separates me as spatially distinct from every other object occupying space in the whole extent of the universe. To this separated object my mind is attached and its whole efficiency is confined to the activities of this object. Without are other material objects and other bodies to which minds are attached. It appears to me therefore that within the spatial limits which mark me out as one among other living creatures, the two natures, the psychical and the physical, are indissolubly united. Yet outside the limits of my spatial organism those two natures, each continuous with my own nature, are completely separate. A living creature therefore has within its individual organism one indivisible nature, but it is twofold because it is linked to two orders of existence which outside that individuality are completely different and entirely separate. It must seem to me therefore that my unity is somehow brought about by a union of what are originally separate, spirit and matter; that I am a composite and not a simple being. My theory is that this is wrong, that a living creature is originally one and simple and that the divergence of the two natures and their apparent separation and independence of one another in the universe is a dichotomy inherent in the nature of living activity.

In order to make this clearer I will repeat the argument

in a slightly different form. When I speak of myself I can distinguish within this self my mind and my body, but it is a purely theoretical distinction for I cannot even imagine the existence of either without the other, the two are essentially and in every important particular one. When, however, I speak of the world outside myself, the case is exactly reversed, for I not only distinguish two sorts of existence, inert matter and active mind, but they are separate and I cannot think of them as one, they are always and in every respect two; so that while in myself it is the duality of mind and body which is theoretical and the unity which is practical, in the world it is the unity of matter and spirit which is theoretical and the duality which is practical, and the more I study nature the more pronounced is the duality. So that if we take the standpoint of the individual as a living centre of activity into which the universe is mirrored or from which the universe is surveyed, it seems as though from the limit of complete fusion at the active centre the two orders diverge ever more widely as the perspective extends in range.

I can now indicate the theory to which these arguments lead. The independence of nature, the priority of the material over the spiritual order, the indifference of matter to the form imposed on it, these aspects of nature are due to perspective and arise out of the monadic activity. They arise from the fact that activity can only be conceived as an opposition of two antithetical forces, a centripetal force which shows itself in the condensation, shrinkage, tension, concentration around a centre, and a centrifugal force which shows itself in dispersal, expansion, extension. There is a force directed inwards and a force directed outwards and the finite individual is the equilibrium of those forces. The limits of the individual are the organic conditions by which that equilibrium is established and maintained. How then does this interpret our view of nature as a hostile force, prior to, and indifferent to, our spiritual purposes, however successful we be in adaptation to circumstances and in making these circumstances subserve our ends? The answer is that this aspect of nature as resistant and hostile

may be deduced from the nature of our activity. This activity is twofold and the duality constitutes our intellectuality. Our activity is both theoretical and practical; we know and we act. Knowledge is for the sake of action. Theory has regard only to practice; action is our pressing need. The life-impulse is the push to act, and action is called for from a living creature at every present moment of its existence. It lives forward-looking and prepared to act. Nature is our view of the universe as the range of our activity and the form of it theoretically conforms to the use of it practically.

It is then a condition of finite individuality that an inert, fixed, static, permanent form of reality should be opposed to the changing reality of life and consciousness. On such opposition activity is dependent. But this only brings a greater problem to light. How are we to conceive the higher unity in which the duality of finite individuality is reconciled? The higher reality and unity can only be what we name God. Does our monadic concept enable us to frame a conception of God?

It seems to me that it does, but it gives us a concept of God which is usually rejected by the religious mind, concerned for a kind of reality with which the personal relationship of intercourse can be established. The monadic God is, in the true meaning of the terms, conceived in our own image, and yet it is neither anthropomorphic nor mythological. Nature is not the field of God's activity. We cannot present to ourselves a field of activity for God in the sense in which the world is presented to us; to do so would be to conceive God as a finite individual on some higher plane. The relation of God to the world is the relation of the mind to the body. We cannot present God, that is, infinite or supreme being, as an agent apart from nature, because "in him we live and move and have our being." Spinoza's concept of God, and not Leibniz's, is the only one consistent with monadism. That it is consistent with monadism I will endeavour to show in the next chapter, I will close this one with a brief recapitulation of the argument I have tried to develop.

We have seen then that nature presents a different problem in philosophy from that which it presents in practical life and in physical science. To common sense and science nature is an external existence which the mind discerns and discriminates and the laws of which it seeks to determine. To philosophy nature is not external, it is an essential element of experience. It is conceived as an opposing force, a hostile power to be overcome and at the same time an opposition which is essential to the activity of mind.

The philosophical problem of nature is to account for the uniformity we observe in it. This uniformity is an axiom or postulate of physical science, but it is a problem of philosophy. We regard nature as a system, but the mere concept of external independent reality does not carry the necessity of order or system. Chaos is not inconceivable, it is not even irrational, though it is the negation of the possibility of science. The essential character of nature is manifoldness; every part is external to every other part and there is no limit to its divisibility. The problem therefore in its abstract form is to understand how the many are one. There have appeared to be two alternatives, either the uniformity is a character of nature which we discover, or it is the work of the mind itself imposing unity on a real manifold in apprehending it.

We have suggested that the clue is to be found in a certain aspect which the relation of mind and body presents to us. In living experience these are known only in their union; they are experienced not as two things in union but as unity. Yet we distinguish in this unity two orders of existence, each, in what is essential to it, antithetical to the other. We come to think that the orders are originally independent of one another and somehow associated in the finite individual. The essential nature of our body is that it is composite. It belongs to the material order. It is separated from the external world, an object distinct from other objects, yet it is continuous with the world, for its constituent elements are drawn from the world and returned to it; also, it is subject to all the laws and

uniformities which prevail in the material universe. Both separation from and continuity with the world are essential conditions of individual life. On the other hand, the essential nature of mind is indivisible unity. Mind is not spatial. It is the unity of a subject of experience. The mind of an individual is separate from other minds, and also continuous with them. It belongs to a spiritual or ideal order which extends beyond the finite individual in whom a particular mind is united with a particular body. It is the extension of these two orders beyond the conditions of finite individuality which gives rise to the belief in their original independence. Were we confined in our outlook to present existence we should be unable to conceive absolute dissociation, for we only conceive our mind separated from our body by the artifice of imagining a new body. It is because outside the limits of our individuality the material order continuous with our body and the ideal order continuous with our mind appear to exist in complete independence that we come to regard our own life as the association of two natures. The duality is an aspect which reality must assume when we regard it from the standpoint of our activity which is necessarily twofold, thinking and acting. This activity involves dissociation, and the dissociation leads to the hypostatization of a mind which thinks and a body which acts. This dissociation, extended beyond the individual, becomes a cleavage between two spheres, a sphere of ends or purposes and a sphere of action. What is really a dissociation appears as an association.

CHAPTER V

THE IDEA OF GOD

Minds are images of the Deity, capable of knowing the system of the universe, and to some extent of imitating it, each mind being like a small divinity in its own sphere.

The totality of all minds is the City of God, a moral world in the natural world, the most exalted and most divine among the works of God.—LEIBNIZ.

Individual things cannot exist or be conceived without God, and yet God does not appertain to their essence.—SPINOZA.

We, who are many, are one body in Christ, and severally members one of another.—ST. PAUL.

WHEN we contemplate the unlimited perspective, radiating in every direction from our standpoint of space and time existence, and consider the infinitesimal range of our action and the brief moment during which the infinite duration converging on our finite individuality is actualized in it, the possibility of giving form to the conception of God, that is, to the conception of an infinite individuality comprehending what we only apprehend, appears presumptuous and extravagant in the highest degree. It seems as though the concept can only be a fantastic one, and that to be reverent towards it, when we have formed it, is the sign of a superstitious and craven spirit. Yet the conception of God is one which the human mind is driven to form by a need inherent in its nature, a necessity appertaining to its essence. Upon its logical consistency depends success in the effort to comprehend the reality of which we form part.

To the philosophers of the seventeenth century God is the beginning and end of philosophical speculation. It was one of the striking features of the rise of modern philosophy

that whatever the special subject-matter the idea of God was the dominant motive. The form in which the problem of the nature of God was debated gives to the arguments of that period a certain remoteness from our actual interests to-day. At times, too, the acrimony of the disputes recalls the bitterness and repeats the ineptitudes of the theological controversies of the fourth century. Yet it is not difficult to see that the problem of divine nature which exercised Spinoza and Leibniz is identical with our problem to-day and nothing but the mode of expression is changed.

The *Ethics* of Spinoza begins with the science of God. Ethics is not for Spinoza a department of philosophy, it is philosophy ; and beginning with the science of God is not choosing an arbitrary starting-point from which to explore knowledge and reality, nor laying down a mystical doctrine as the foundation of a system : it is the deliberate adoption of a method which he defends as the necessary and characteristic method of philosophy. We must begin with a comprehensive grasp of the whole if we would understand anything as a part, for the nature of the part is derived from its relation to the whole. The whole is immanent in every part. The denial of this would be the negation of system and would destroy at the outset the possibility of science of any kind and not only of philosophy. The cause of the failure of so many philosophers who have striven for a consistent theory is, he tells us, in their not having observed the order of philosophical argument. " For divine nature, which they ought to have considered before all things, for that it is prior in knowledge and nature, they have thought to be last in the order of knowledge, and things which are called the objects of the senses they have believed to be prior to all things " (*Ethics*, Pt. II. 10).

What then is the essential conception of God ? It is a conception we must form because it is a necessity of human thought. To understand it we must set aside any consideration of what we are accustomed to call the attributes of God. We want to know the essence of God. This essence is, in the terms of the ontological argument, a being

absolutely infinite and perfect in all things. What positive meaning can we assign to these terms, infinite and perfect? The whole value of the philosophical conception depends on the answer to this question. The reality we know directly in experience is finite and incomplete. It is finite because our activity is circumscribed, it is incomplete because our perspective is limited. The horizon which bounds our outlook in space and time does not circumscribe our universe. We are accustomed on this account to think of our individuality as finite and of our universe as infinite. Yet God cannot be infinite in this meaning of the term, for this would be incompatible with perfection. Space and time are infinite in the precise sense in which an arithmetical series is infinite, they have no last term. The argument, therefore, for the divine being must proceed differently. It cannot be based on the limitations of our knowledge, for then we should only be hypostatizing the unknowable; and it cannot be based on any supposed necessity of reconciling the antinomies in our concepts of space and time, for success would destroy the character of our perspective. The argument must be based on the concept of individuality itself. The finitude of our individuality is the direct perception of a greater individuality within which our individuality is included. Individuality is in the very concept of it infinite and perfect. Finitude, that is to say, is an imperfection of individuality, and in so far as we perceive ourselves to be finite we perceive ourselves to fall short of individuality, and in so far as we perceive individuality to be reality, we know God.

The philosophical conception of God is therefore the idea of infinite individuality, and this is not an arbitrary idea dependent on the play of fancy or on creative imagination. It is not the idea of a person, conceived as an object within our perspective, perceiving what we perceive, understanding and sharing the motives which prompt our actions,—a person like ourselves but transcending our limitations and of an infinitely exalted character. No success in imagining an agent within our perspective, acting on the plane of our activity though unlimited by its range,—however inspiring

and comforting the contemplation, however solid and assuring the ground, however unwavering the faith in its real existence,—will give us philosophical satisfaction or advance us one iota towards the conception of God which philosophy requires. The philosophical conception of God lies on a higher plane, and it is on a lower plane that ordinary religious experience moves. This is why religious arguments conceal rather than reveal the necessity of thought which leads us to affirm the existence of God. When we turn to religion for hope and consolation in the presence of the great mystery of death; when we seek support in trial; when we are shocked at the idea of injustice and, conscious of rectitude, find our motives misunderstood, our affections unrequited; we may seem to be obeying an instinct of our nature when we put our trust in God. But the God in whom we trust is an idol of our imagination. We construct it and then lean on it for support. But even could we endow it with real existence or discern in it independent activity, it would be as far away as ever from the satisfaction which philosophy needs.

On the other hand, the philosophical conception of God is not an attempt to conceive the unconditioned, to conceive an existence transcending space and time, causality, and every category by which our experience is co-ordinated, or to conceive a being who stands to the whole realm of experience as its ground and source and origin. This has been the main line which the arguments for the existence of God have followed. These arguments have appealed forcibly to theologians because they have seemed to be based on a self-evident principle of reason, and so to establish theology on a firm foundation. The attempt has always proved illusory, for there exists no way in which the unconditioned can take shape in a positive conception which does not involve us in the very antinomies from which it was designed to deliver us. The true concept of God, which alone will give satisfaction to philosophy, must present him not transcendent, but immanent in the world. We have only the true idea of God if we see that the world is as necessary to God as God is to the world.

This is so important that it is worth while to illustrate it with some care.

There are three famous proofs of the existence of God. They are named the ontological, the cosmological and the teleological. It was Kant who summed them up under these three heads. There are many forms of demonstration, but they can all be ranged under one or other of these three, and the emphasis laid on one or other of them not infrequently serves to characterize a philosophy and mark its range and standpoint. In scholasticism they fall into two groups representing antithetical doctrines of the nature of universals which go back to Plato and Aristotle. It is the antithesis between those who explain experience by the concept and those who construct the concept from experience. In medieval philosophy those who belonged to one group were named realists, they represented the Platonic tradition and include St. Augustine, St. Anselm, who has given his name to the ontological argument, and St. Bonaventura. The other group was that of the nominalists, who were followers of Aristotle, and their system culminated in the great work of St. Thomas Aquinas. To the realists the ontological proof was in effect the whole basis of philosophy, whereas the nominalists rejected it altogether.

The ontological argument deduces the existence of God from the idea of God. Its syllogism is not a process of thought, it is a didactive elucidation limited to explaining the premiss—there is an idea of something greater than which nothing can be thought to be. This idea must include existence. To the ordinary mind it sounds like a logistic puzzle. As dialectic it may be unanswerable but like all pure dialectic it fails to carry conviction. The syllogism runs thus,—God is the idea of an absolutely perfect being ; perfection includes existence, for what lacks existence falls short of perfection ; we have the idea of this perfect being ; therefore God exists. The fool may say in his heart there is no God, but in so saying he only proves that he is a fool. He is self-stultified, he prides himself on putting into words what is unthinkable.

Before attempting to estimate the philosophical value

of the ontological argument, it is well to place the other arguments beside it in order to bring out the contrast. To St. Thomas Aquinas the ontological proof appeared to reduce itself to the bare judgment of identity,—if there is a God then he cannot not-be. It did not touch the case of one who really denied that there is a God. But then God was not for St. Thomas an innate cognition, the only innate cognitions he recognized were logical principles, the law of contradiction and the like. He was confident of the power of thought itself, without innate truth, without any presupposition, simply by the logical elaboration of natural cognition, to attain reality and know God. His proofs consequently, five in number, are none of them *a priori*, but all proceed from and depend on direct experience itself.

Three of the five proofs are forms of what Kant afterwards called the cosmological proof, the other two are forms of the teleological proof. They can be summed up very briefly. The first is taken direct from Aristotle. Nothing moves which is not moved; movement therefore supposes a mover; the series of movements and movers cannot be infinite; therefore there must be a prime mover and this is God. The second proof is the same form of argument applied to the series of causes and effects. There must be a first cause and this is God. The third is the argument from the contingent to the necessary. A first cause cannot be contingent, it must have its being from itself alone and be necessary. This necessary being is God. The fourth is the argument from effect to cause where the effect is the logical condition of the cause and therefore itself the final cause. The world is the final cause on account of which the first cause is efficient. The effect, that is to say and not the cause, is the logical beginning. The full explanation only appears in the fifth proof, which is the argument from the evidence of design in nature. This last and best known of all the arguments really gathers the others into itself. Design in nature is evidence of the existence of an intelligent being. This being or mind is God.

The cosmological and teleological arguments are closely

associated, and, taken together, represent a principle which is directly antithetical to that of the ontological argument. So that instead of three arguments of cumulative force we have two directly antithetical principles which make a completely different appeal, and in fact the acceptance of the one generally carries with it the rejection of the other. The ontological argument appeals to the intuition of existence, and its dynamic character is not the syllogistic form in which it affirms a necessary relation between existence and essence, considered as distinct and opposite concepts, but in the intuition that essence includes existence. This is not self-evident, on the other hand it is directly contrary to what appears self-evident. Existence appears to us the all-inclusive term, within which any essence may either be or not be, but which itself cannot be included within any essence. When then we conceive God, what we conceive is essence, and it seems to us that God like every other ideal content of thought may or may not exist. The ontological argument shows that in conceiving God we are conceiving infinite essence, which means that we conceive an individuality without the limitations which attach to our individuality, these limitations consisting precisely in the fact that they fall within a more inclusive concept, existence. God is finite like ourselves if he is included within a wider concept, existence, from which he might be excluded. Either, therefore, we have no theoretical knowledge of God, and this was Kant's view, or else we have the concept of an essence which includes existence.

There is, however, in regard to the ontological argument a more important consideration than that which concerns its logical power to carry conviction, the question namely whether the truth which it purports to establish is of any value in itself. Is the argument anything more than a piece of dexterous logomachy? Is it other than an exercise in logistic, a circular argument playing around abstract terms devoid of real significance? Those who reject the argument undoubtedly do so because they so regard it. It is impossible to declare it false, but it can be urged that it is a mere tautology repeating in the conclusion what it has

imported into the premiss. Only, it will be said, if in the concept of an infinite and perfect being you include existence, can you conclude from the concept that God exists. Those, on the other hand, who accept it attach absolutely no value to its syllogistic form but only to its ground in the intuition. It directs the mind to a truth about thought and reality which, so far from being obvious, trivial, or unimportant, is not only directly contrary to common sense and scientific realism, but the very condition of philosophic insight.

The cosmological and teleological arguments appeal to a totally different and antithetical principle. They appeal not to an intuition expressed in the content of a concept but to the principle of causality which is the basis of ordinary and scientific explanation. The cosmological argument rests on the principle of efficient causation, which is the postulate of physical science, the teleological on the principle of final causation or design, which is the postulate of biological and mental science. The weakness of the first is that the conditions of the premiss exclude the possibility of the conclusion. How can the fact of experience that every cause of an effect is itself the effect of a cause support the conclusion that there is a cause which is not an effect of a cause but a *causa sui*? The conclusion affirms a fact which contradicts the fact on which the premiss is founded. The teleological argument is also weak in an equally essential particular. If there be evidence of design there is equal evidence of unachieved purpose and imperfection. How from an imperfect and incomplete and short-coming creation can we argue to the existence of perfect intelligence and power?

The two currents of thought ran together in close association throughout the scholastic period. They represented two fundamentally different and opposite concepts of God and reality. The ontological argument was not a logical demonstration, those who held it had no need of logical demonstration, they gave it logical form to satisfy the current demand for proofs. The evidence was immediate and intuitive. True cognition in their view was innate

and not derived from experience. God and reality were intellectual and immanent, not transcendent. For the other view true cognition was a construction of elements furnished by sensible perceptions.

With the rise of modern philosophy the ontological argument acquired a new significance. It was adopted by Descartes, and made by Spinoza the pivot of a complete system of mathematically deduced philosophical propositions. It was rejected by Kant, and his refutation is not only one of the most important doctrines in the *Critique of Pure Reason*, and a notable event in the history of modern philosophy, but it forms a kind of sign-post pointing two divergent directions in constructive philosophy. Hegel reinstated the argument. It lives to-day in the theory of the Absolute of F. H. Bradley ; in the argument so forcibly expounded by Bergson in *Évolution Créatrice* that the idea of nothing is a pseudo-idea ; and it is adopted by Croce in his theory of the concrete universality of mind. On the other hand, it is generally rejected, or discarded, or despised, by all philosophies which rest on empirical as distinct from intuitive principles and by all who are realists in the modern epistemological meaning. It has come therefore to be regarded as identical with one of two divergent philosophical methods. It is cherished by those who follow the *a priori* route, rejected by those who recognize only the *a posteriori*.

It is not difficult to understand the greater attraction to the ordinary mind of the cosmological and teleological arguments when compared with the ontological. The latter appeals to a cold logical formula impossible to clothe with the warm flesh and blood existence our nature craves for. The other arguments, however remote they may be from practical interest, do at least appeal to the imagination and easily lend themselves to artistic representation. We can take interest in a God, clothed though he be with infinite attributes, whose throne an archangel can dispute, whereas a God whose essence involves existence evokes no emotion and leaves us aesthetically and ethically cold. Rebellion against this God is absurd, even Satan cannot for one moment deceive himself with prospect of success,

for the only thing of which he could deprive God would be the existence on which he, Satan, himself depends. The yearning of the human heart is for a God of whom we can make a graven image, who can manifest himself to us by some expression which we can cherish as a personal token, just as we cherish the picture or keepsake of a lost or absent friend. The ontological argument gives us a God whose existence does not call for faith, because it admits of no doubt, whom we cannot represent because he is ever present, whom we cannot long for because he is never distant or absent or separated from us. Is there any value in an idea which not only leaves unsatisfied our whole aesthetic nature but seems to condemn it as a positive defect ?

If this be the aesthetic difficulty, a far greater difficulty awaits us when we consider the ethical consequence. The conception of God which the ontological argument establishes negates the idea of freedom and imposes a rigid determinism which in ethics inevitably leads to some form of fatalism. A striking illustration of this is afforded in the form which Christian theology assumed in the doctrine of Calvinism.

Calvinism is simply the acceptance of the ontological argument with its full logical and ethical consequences, combined with the Christian belief in an historical revelation and in an inspired authoritative exposition of the scheme of salvation in the Scriptures. It is the God of Spinoza with the Pauline interpretation of Hebrew history. The stumbling-block has always been its ethical consequences. On what rational ground can you appeal to a man to act righteously, to eschew evil and follow good, save only on the presumption that he is a free agent ? Yet in the whole Calvinist scheme there is nowhere left even the bare possibility of a free act. The conception of God blocks the possibility of human freedom and reduces the consciousness of it to an illusion due to limited perspective. We get the curious practical dilemma, the one horn of which is that God exhorts us to holiness, the other that holiness is entirely dependent on the grace of God. Human conduct can only be judged good or bad to the extent to which man is

a responsible being, yet all responsibility rests ultimately and entirely in God. It is no exaggeration to say that this problem has not only exercised the human intellect throughout the whole history of philosophy, but it has been the main theme underlying the modern development. In the seventeenth century it took a pronounced theological form consequent on the Reformation of the sixteenth century and the revival by Luther of the Pauline doctrine of justification by faith. The cleavage in theology was not confined to the reformed religion, it appeared in the Catholic church as well. It produced the Puritans in the one, the Jansenists in the other. In philosophy to-day the theological interest has been superseded by the secular interest, but it is our problem still. It is, however, only when we take account of the absorbing nature of the theological interest in the seventeenth century that we can understand the overwhelming importance which the philosophers of that period attributed to the true conception of God.

It is difficult for us to-day to realize the torture which the religious mind has suffered in its attempt to reconcile the ethical dilemma. It finds expression in the Pauline writings, but it is suppressed, deliberately thrust aside as an impiety, over-ridden by the intense missionary zeal of the new faith. "Who art thou, O man, that repliest against God?" In the fierce controversy which marked the revival of Paulinism in the sixteenth century it found full expression. It divided Christianity into hostile camps, one of which exalted the conception of God and fearlessly accepted its logical consequences, leaving ethics to take care of itself; the other, not disputing the conception of God, but undismayed by logic, in its ardour for the gospel of redemption.

It is not a little curious to study the way in which Calvinism found a practical solution of the ethical dilemma in its doctrine of the grace of God. Theoretically the Calvinist scheme rested on the doctrine of the absolute sovereignty of God and shrank from no consequence in its deductions. It was open to all the denunciations of impiety which critics and opponents freely outpoured

on it. It might acclaim the holiness of God, but no argument could save it from the charge that it made God himself responsible for the sin which was hateful to him. The creation with all the consequences of Adam's fall was not only foreknown, but fore-ordained, eternally decreed. Nothing whatever was contingent. The redeemed were elected, the damned were reprobated. There was no place for repentance. God had created hell and pre-ordained its inhabitants and all for his own glory. To the horrified opponents of the doctrine it seemed no blasphemy to declare this God a devil. Yet Calvinism produced saints and heroes and martyrs. It satisfied the unselfish religious emotions of many generations. It is doubtful if there has ever been an actually genuine instance of a Calvinist "indulging in sin that grace may abound." What saved their diabolical concept from disastrous consequences in practice? It was saved by its doctrine of grace. In the first place it exalted human nature. It turned faith into a means of grace instead of making it, as its opponents did, an arbitrary condition of salvation, thus raising the doctrine of justification by faith into a rational system. But above all in making faith a rule of life and in finding in righteousness the one sure sign of election, it made it *a priori* impossible to use assurance of election as a motive for sin. The holy life,—a holiness which no feigning could turn to self-deception, for it consisted not in outward observance but in purity and cleanliness of inmost thought and sentiment,—was the one and only sign of election.

An illustration of the way the conception of God not only formed the main problem but limited the horizon of the philosophers of the seventeenth century is afforded us in the correspondence between Leibniz and Arnauld. Leibniz had summarized the principles of his metaphysical theory, not for general publication but for submission to authoritative opinion. He secured means to have his summary brought to the notice of the recognized leading theologian of the Catholic Church, Dr. Arnauld, world-famous for his wide erudition and joint authorship of the

Port Royal Logic and theological head of the Sorbonne. The reason appears to have been that Leibniz was earnestly endeavouring to reconcile the Protestant and Catholic doctrines, with the object of making reunion possible, careful, therefore, himself not to be committed to either side. Arnauld received the summary entitled "Discourse on Metaphysics" and at once singled out the characteristic doctrine of Leibniz, the principle of individuality, and shows that it makes creation as taught in the theology of Christianity inconceivable, and the whole scheme of redemption unmeaning. "The individual concept of every person," Leibniz had written, "involves once for all everything which can ever happen to him, in it can be seen *a priori* the evidences or the reasons for the reality of each event and why one happened sooner than the other." "If this is so," Arnauld wrote in reply, "God was free to create or not to create Adam, but supposing he decided to create him, all that has happened to the human race or which will ever happen to it has occurred and will occur by a necessity more than fatal. For the individual concept of Adam involved that he would have so many children, and the individual concepts of these children involved all that they would do and all the children they would have; and so on. God has therefore no more liberty in regard to all that, provided he wished to create Adam, than he was free to create a nature incapable of thought, supposing he wished to create me." In the correspondence which followed Leibniz explained his meaning and defended himself from the charge that his principle involved a limitation of the freedom of God. What interests us, however, is the difference in the conception of God, and his relation to the world in the act of creation. If the world be a monadistic reality then in creating it God gave existence to the monads, foreknowing their nature because the concept of them was in his mind. If, on the other hand, the world be a monistic reality and there are no monads, the act of creation is the bringing to existence of a matter or stuff which God will then mould or shape as he will, and every attribute of reality will be directly brought about by his act. The conception of God is thus

seen to depend on two opposite concepts of the nature of reality; and conversely these opposite concepts of reality lead to opposite conceptions of God.

I will state the two positions in my own words. Arnauld evidently held the common opinion that what exists is an inert stuff or matter created by God and fashioned or shaped by him to fulfil his purposes like clay in the hands of the potter. Whatever excellence created things possess they receive it directly from their creator. This was the theory of creation, and it had to be reconciled with two significant historical events, the fall of Adam and its consequences, and the death of Christ which furnished the means of salvation. Leibniz, on the other hand, held that the act of creation was the bringing into existence of active subjects of experience. Each subject is in principle an individual possessing his own perspective and responsible for his own actions. These individuals were present to the mind of God as concepts when he chose to create them. Creation was the act which gave them existence. Their activities and consequent actions, and therefore the events which followed them, were present to the mind of God in the concepts, but God did not create the concepts, he chose among concepts, which were possibilities, those to which he would give existence.

To appreciate the thought of the philosophers of the seventeenth century we have to bear in mind that in one particular there was a striking contrast between their world-view and ours to-day. The Copernican revolution of the sixteenth century and the new conception of a heliocentric instead of a geocentric universe with all that it involved had brought to them another world-view than that of the scholastic and medieval philosophy. The perspective of the universe had received an infinite extension in space but no corresponding change had been brought about in the perspective of time. As far as space was concerned the concept of an indefinite extension with no privileged centre offered the same problem to them as it does to us to-day. But no revolution had occurred to effect a corresponding change in regard to time. This did not

occur until the latter half of the nineteenth century, and the Darwinian revolution which effected it is within living memory. It has given to our outlook on time the same infinity of range as there is in our outlook on space. This makes it especially difficult for us to enter into the problems of the seventeenth century as they took form in their world-view. Practically every one of account in their intellectual world not only found it easy to accept, but had no ground for doubting, the general opinion that the world had come into existence as an event in what seems to us the quite incredibly recent past, and was destined to go out of existence as a more or less dramatic event in what seems to us an absurdly inadequate concept of the future. We have therefore to keep this limitation in view if we would appreciate the form which the problem assumed and use it to throw light on our problems to-day. Both Leibniz and Arnauld, for example, were agreed that human experience must have come definitely into existence as an event which they denominated creation and attributed to the act of God, antecedent to which act was the purpose conceived in the mind of God. In common with the generally accepted and undisputed opinion they believed this event could be dated, though many with Newton questioned the chronology of the Old Testament. Both sought from their knowledge of the nature of a world they held to have been created, to determine the nature of the antecedent act of creation.

The special merit of Leibniz is that he grasped the principle of individuality with a clearness which has never been surpassed, and which is without equal in the service it has rendered to philosophy. He saw that to create an individual is not to bring to existence an inert stuff and shape it to move in certain ways, or to endow it with definite powers of response to external influence, for in the concept of the individual is already involved its perspective and its activity. Leibniz thought indeed that the monads might be created or annihilated, and he conceived God as having before him the concepts of all possible worlds and choosing from them the best, a notion mercilessly satirized in Voltaire's

Candide. If we with our time-perspective accept Leibniz's principle of individuality, we must reject his notion of creation, for it is plain to us that the concept of an individual not only involves the sequence of the events which will follow but the infinite series of events of which it is the consequence, that in fact an individual holds in his present activity an accumulated past as well as an unrealized future. We must therefore conceive God differently, we must conceive him not as transcendent but as immanent, not as a super-individual creating or annihilating finite individuals as he chooses, but as an infinite individual, the complement of finite individuality.

This brings us to the modern problem. I have already referred to the two different theories held by philosophers to-day as to the nature of finite individuality—the substantive and the adjectival theories. The substantive theory is monadistic, but conceives the monads in one essential respect differently from the way in which Leibniz conceived them. The individual is held to be exclusive and to exist in his own right, but his range of activity is limited not by his inner nature and perspective, as Leibniz conceived, but by other individuals substantially distinct to whom his relation is external and with whom he acts and interacts. Individuals in this view are objectively and not only subjectively distinct; they are actually separate one from another. The adjectival view is that the individual is wholly constituted by its relations to, and inclusion in, the universal absolute experience. Individuality in this view consists in the fact that the absolute or infinite individual appears or expresses itself in finite centres of activity. Finite individuality is therefore a mode of the expression of a reality which is one and universal. These two opposite views may seem to repeat with hardly noticeable difference the theories of Leibniz and Spinoza, but the line of demarcation is different. The theory of the Absolute, when fully expounded, though apparently a monistic theory, yet in its concept of substance as subjective activity and not as an inert substratum, and in its insistence on inclusiveness, resembles Leibniz's concept of the Monad rather than

Spinoza's concept of God; whereas the pluralistic theory with its interacting individuals requires for its background the notion of substance as inert extension.

In ordinary experience our conceptions are formed by purely practical considerations, and individuality is no exception. The urgency and primal necessity of preserving at every moment and from moment to moment the form of our activity; the convergence of our whole being on present progressing action; the continual dispersion and restoration of our store of necessary energy; the disturbance from moment to moment of our equilibrium and its continued maintenance; impose upon us an attitude of forward-looking attention which makes our immediate environment and the first form of our apprehension of things the type of reality to which the hidden aspect must of necessity conform. We are as unconscious of the strain and burden of this attention to life as we are unconscious of the weight of the atmosphere, of the attraction and repulsion of the earth's centripetal and centrifugal forces due to its movement. At every moment and from moment to moment the living organism is called on to act, and if the response fail, life fails, for life consists in unceasing adaptation, yet we pass our lives in ignorance of it. It is the body which by its structure seems to give us the power to act, yet of the activity required to maintain the structure we are wholly unconscious. Individuals appear to us as primarily and essentially a plurality; plurality seems to depend on definite structure; and structure is wholly dependent on the spatial concept. Even a structure which is not spatial, such as a symphony or poem, can only be conceived by the aid of a spatial scheme. Our direct and immediate relations with other individuals in ordinary experience are with the bodily presence of our fellows, for only by bodily movements do we interpret their minds. Men's bodies, therefore, as definite structures, rather than their minds, seem to determine their individuality. The world of action is a spatial world, individual agents present a sameness of type in bodily structure and functions, and spatial relations come to be regarded as the basis of existence. Individuality therefore to ordinary

thought means plurality, plurality means repetition, the complete separation of numerically different structures identical in type.

A completely different aspect of individuality is presented to us, however, when instead of regarding the body we study the mind. The ideal structure of an individual mind is wholly constituted of its relations to other individuals. The essence of mentality is to comprehend and be comprehended. No two minds are numerically different and structurally identical in the same sense in which two bodies may be. Individual minds derive their individuality not from mutual exclusiveness but from mutual inclusiveness. They qualify or characterize an absolute, without composing or constituting it by aggregation. That is to say, no means exist of circumscribing individuality when you intend purely and only the mind. Test it in what way you will, by introspection or by observation, there is no way of detaching, or dissociating, or even of ideally articulating, the relations,—personal, family, social,—sensual, intellectual, emotional,—aesthetical, logical, ethical,—which are fused together and interpenetrate one another in an individual mind. A mind is not a thing which has these relations, it is these relations and they are the mind. There is no scheme by which it is possible to dissect the mind in the same or in a similar way to that in which we dissect the organism.

The moment we turn our attention to this contrast between the individuality presented under the spatial form of the organism and the individuality presented under the non-spatial but distinctive form of the mind, it becomes clear that we are not dealing with two individualities, or with two forms of individuality, but with one individuality presenting two aspects: for the mind must have embodiment, and the body must have consciousness, not in association with one another or as a property or quality one of another, but because the essence of function involves structure and the essence of structure involves function.

It is this perception of the necessary unity of mind and body, of the impossibility of the conception of individuality

save only as mind acting through body, and body serving mind to give the efficacy of action to its activity, and the perception that what holds good of the microcosm must apply with equal force to the macrocosm, which is the basis in human thought of the idea of God. It seems to me moreover that this was the driving force in the philosophy of Spinoza and Leibniz. But whether this be so or not, I maintain that it is not the cosmological or the teleological or any other logical argument from which has sprung our idea of God but from the deep intuition of the essential unity of thought and action, mind and body, in our experience as finite individuals.

If this be so, if it be the mind-body unity, and not some extraneous deduction or induction from the objective order presented to the mind in experience, which is the intuitive basis of the God-concept, the God-concept will in its turn throw light on the mind-body unity. In other words, not only does the relation of mind and body in the finite individual suggest to us, by a kind of unconscious analogy, the relation of God to the universe, but it also indicates to us the direction in which we must seek the solution of the persistent and continually recurrent problem of philosophy—the interaction of mind and body.

It is significant at least that anthropologists are generally agreed in tracing the origin of the idea of God to the animistic notions of primitive man. This, however, does not carry us far or help us much. Animism tends to emphasize the complete dissociation of mind and body. The fundamental fact in which I seem to discern the intuitive source of the innate necessity of thought which becomes the concept of God, is rather the fact of the inseparability of mind and body, notwithstanding the dual aspect which our finite individuality presents. This individuality involves two antithetical principles, and as viewed from our human standpoint the principles are not only mutually contradictory and opposed, but each seems to rest on an order of reality extending indefinitely beyond the range of the finite individual. The one, the body, secures to the individual complete exclusion, it is a principle

of division and separation, it assigns us a boundary in space and time, and inserts us in the vast, boundless, universe of physical nature. The other, the mind, secures to the individual complete inclusion. It is a principle of comprehension. It knits us in internal relations. It brings the universe within us instead of securing our insertion in the universe, it relates us to the whole of existence and the relations are not external but constitutive of our being. While my body separates me from all the rest of the universe, cutting the universe in two, the portion without and the portion within my skin, my mind not only shows me myself in the universe but the universe in me. It not only brings me into relation with other minds, as my body brings me into relation with other bodies, but it makes me a member of the community of minds in a quite different order of existence to that in which my body makes me one of the things in the spatial universe. In the actual mind-body of the finite individual I have these two principles not in association, not even in an *a priori* synthesis, but in the absolute unity of living experience. What to my intellect cannot but appear as two distinct and antithetical orders, to my living experience is indissolubly one. This is what I find finite individuality to be. It is precisely this that I believe infinite individuality to be. The idea of God arises, I believe, in the intuition of the unity of mind and body, of thought and action, of function and structure, in the activity which alone is reality.

Let me try to be still more precise. In the moment of experience mind and body are not two things but one. It would be impossible even to make the distinction were experience confined to the actual, without outlook on the past and on the future. When we conceive universal activity in the same mode in which we conceive our individual activity, in the living intuition in the moment of experience, then we have the idea of God. And we must think universal activity as existing in this mode, because, when our consciousness takes the form of reflexion and attention, the moment of experience becomes for it the meeting-point of two distinct orders of

existence, an ideal order and a real order, the one continuous with our subjective consciousness, the other with our objective activity, and each order is determined by its past and determines its future. If then the unity of these two orders in the moment of experience is real, their duality in the time-perspective is appearance. It is the fact, then, that our experience though finite is continuous with an activity that envelops it, which compels us to conceive a unity beyond finite experience. It can only be the unity of infinite individuality, because it is the incompleteness of finite individuality which necessitates the concept. That is to say, mind and nature are separate realms in our perspective, but a unity without distinction in the intuition of the actual moment of experience. If then we conceive their ultimate unity we can only conceive it on the principle of the activity we know in the moment of experience. In this way we conceive God not as transcendent but as immanent in us. I do not mean that nature is God's body, or even that it is God's garment, to use the language of poetry, and I do not mean that behind nature we may recognize God's mind, in the way that our neighbour reveals his mind by his bodily actions. To imagine God in this way is to limit God to an object in our perspective, whereas philosophy requires that if we conceive God we conceive him as he is in himself, in his infinite individuality. What I do mean is that we can only conceive universal activity on the same principle as we conceive our individual activity in the moment of experience. We can form no image of God but we can and must conceive him.

I will briefly recapitulate the argument. In modern philosophy the idea of God is part of the general problem of individuality. In the seventeenth century the theological concept of God was the beginning and central point of speculation. This was due to the strong human interest aroused by the religious reformation of the sixteenth century, and particularly to the revival by Luther of the Pauline doctrine of justification by faith. There are two divergent lines in philosophical speculation as to the nature of God and the proof of his existence. The

one tendency is to regard the knowledge of God as an innate intuition of the human mind, the other is to make it depend on a reasoning process. The famous three arguments or proofs of the existence of God,—the ontological, the cosmological, and the teleological,—are not cumulative in force but antithetical and opposed in their direction. Those who rely on the ontological proof have no need of the other two, and these add nothing to its force; on the other hand, those who rely on demonstration usually reject the ontological proof.

There are two views in modern philosophy as to the nature of the finite individual. One is the adjectival view, according to which the individual is wholly constituted of his relation to a universal experience, the Absolute. His individuality consists in the fact that the absolute appears or expresses itself in temporary centres of activity. Individuality therefore is a mode of the expression of a universal reality. The other is the substantive view, according to which the individual is exclusive and exists in its own right. Its range of activity is limited by other individuals, but its relation to these is external and it is substantially distinct. The ordinary view of individuals is that they are a plurality. There is a practical ground for this. In ordinary thought we take men's bodies rather than their minds as the definite structure which determines their individuality. We contemplate the world as a spatial system. Men's bodies present to us a sameness of type in structure and function, and spatial relations become in consequence the basis of existence. Individuals appear as a many. When we attend to the mind structure, individuals seem constituted of their relations to one another. Individuals seem to derive their reality from inclusion in a greater individuality.

Existence has a different meaning therefore according to whether we predicate it of the body or of the mind. When we say that a body exists, we mean that it adversely occupies space during some interval of time. When we say that a mind exists, we mean that it is an activity enduring through continual change. There are

no spatial outlines which limit minds and prevent their interpenetration. When we make the finite individual the subject of a judgment, if the spatial body be the subject then we have the concept of substance or thinghood. It involves the idea of present existence. A thing to be definite must be here and now. If, on the other hand, the mind be the subject, its present existence is not actuality but potentiality.

In individual activity there is no dissociation of body and mind, of thought and action, of function and structure. Mind and body cannot even be said to be united in their activity, for the activity is a unity which precedes distinction. When we reflect on our activity from the standpoint of its process, it appears as though the moment of experience must be a unity brought about by the association in that moment of the mind and the body. Yet the intuition of our reality in that moment is the intuition of original unity. My theory is that the unity is original and not an association; and that the distinctions which arise in the process of our activity are a dissociation. It is the intuition of this unity which is the basis of the necessity of thought which posits the idea of God, the idea of a higher unity, the infinite individual whose essence involves existence.

PART II

PSYCHOLOGICAL: THE ACTIVITY OF THE MONAD

CHAPTER VI

THE MOMENT OF EXPERIENCE

And then he drew a dial from his poke,
And looking on it with lack-lustre eye,
Says very wisely, "It is ten o'clock:
Thus may we see," quoth he, "how the world wags:
'Tis but an hour ago since it was nine;
And after one hour more 'twill be eleven;
And so, from hour to hour, we ripe and ripe,
And then, from hour to hour, we rot and rot,
And thereby hangs a tale."—SHAKESPEARE.

CONSCIOUSNESS or pure knowing accompanies a very infinitesimal portion of our whole activity and seems attached to it by a very inconstant bond. It is certainly not the whole monadic activity. Only in the higher monads does it exist at all. If we agree with Leibniz in describing the whole monadic activity as perception then we must allow that perception is not only possible where consciousness is absent but for the most part perception is altogether devoid of consciousness, that is of consciousness in the pure sense of knowing. In us consciousness appears as a halo of illumination playing round the focal centre of our activity. It is intense at the point and at the instant of progressing action, but it fades away in a penumbra as we move from the focal centre. It seems to have no dividing line. It is very intense and concentrated when our action demands effort or has to deal with a new and unwonted situation. When the progressing action is ordinary and habitual or automatic, consciousness is relaxed and dispersed. Actual consciousness or knowing seems concerned with our activity at the focus where action is forming, to be gathered together and concentrated on the progressing action. It appears

indeed as though the action itself produced a kind of phosphorescence called forth by the nature and need of the action itself and as though the intensity of the illumination were relative to the need. We may then describe consciousness, in its specific meaning of knowing or awareness, as *an intensity at the focus thinning off till it fades away at the periphery, and neither at the focus nor at the periphery having any clear outline or distinct division.* Or, in other words, *consciousness is distinguished internally only by its degree of tension or concentration.*

When we consider the content of this consciousness, or the action which it illuminates, consciousness then itself seems to be distinguished by its clear and distinct outline. The chief aim of knowing seems to be to give precision to the form and matter of what is known. If knowing is the indefinite light dispersed or concentrated, the known is that which the light serves to delineate. Knowing and knowledge, consciousness and content of consciousness, are not two things brought into relation but one thing internally distinguished, and the distinctiveness of knowledge characterizes knowing, the clearness or obscurity of the content of consciousness characterizes consciousness. We represent in fact consciousness as itself divided crisply into moments of experience, which, when distinguished as now and then, are conceived with definite, precise and absolute outlines. Consciousness may seem incapable of delimitation into moments, just as flowing water seems incapable of resolution into distinct drops, but as flowing water is decomposable into drops so is consciousness resolvable into moments, on any principle and according to any order. We have therefore another and opposite character of consciousness. It is gathered into moments, each with its own cognitive content, its own emotional quality, its own feeling tone, its own perfect individuality. Each moment of experience corresponds with the actual centre of activity in the progressing action of the subject, but it marks a distinct and definite state of progress of the action, a state which when past is accomplished and unalterable. It seems therefore that consciousness or knowing

is itself articulated; the joints may not be easy to trace and the association of states may be in a measure indefinite, but they are clearly marked off from one another and exclusive. We have therefore a second characteristic of consciousness. *Consciousness consists of states only one of which is present; every present state of consciousness is separated by a distinct and definite outline from every remembered or anticipated state; and the quality and content of its present state will in some form attach to it when it ceases to be present and is only remembered.*

In this twofold characteristic of the individual consciousness, first, that it has only internal distinction and difference in degrees of intensity, and second, that it consists of states exclusive of one another and different in kind, we may see a close and significant analogy with individual existence itself. Every individual creature in his range of activity is distinct and separate and exclusive and therefore different in kind from every other individual, and yet every individual is only a focus of the activity of a reality which has no divisions or boundary lines and which differs only internally in the degree of its tension or extension. No one with our modern world-view and the knowledge which science has developed, whatever particular theory of our origin and destiny he may hold, can doubt that the living individual is one with all that lives and with all that has lived. Every living form, animal or vegetable, is the expression of an activity which is not theoretically or abstractly or collectively one activity but essentially and indivisibly one. Whether life be a property of certain forms or combinations of inert matter under certain special conditions as some suppose, or not, it is hardly disputed that the actual phenomenon of life is one in its origin and in its manifestation. Yet this activity manifests itself in myriad special forms each possessed of that absolute exclusiveness which belongs to the moment of experience in the individual himself. If this analogy hold, if it be really the case that in the moment of experience we have not merely a phenomenon repeated in myriad centres of activity but the very principle of life itself; if the moment of experience

be to the individual what the individual is to the universe; then it follows that the situation of consciousness at the centre of our system, at the point of focal intensity, and the consequent inconceivability of transcending the system and viewing it from without, so far from being a disadvantage and handicap in our effort to comprehend reality is a positive privilege of philosophy, enabling us at once and with certainty to know reality as it is in itself.

In the moment of experience, then, we have the actual focus of individual activity. The activity which is spread over the whole life of the individual is there seen at the point at which action is progressing. By studying it we are turning our attention on the very centre of the reality we are seeking in philosophy to understand and raising the metaphysical problem of its ultimate nature in its clearest and most definite form.

What, then, is the moment of experience? It is the present moment, the moment in which what we are actually experiencing is contained, as distinguished from an abstract mathematical moment of time which has no content at all. Whatever we experience is now, and only what is now is immediate experience. But the word "now," as used in ordinary discourse, is vague. Any one unexpectedly asked to say what length of clock-time he associates with his moment of experience would probably hesitate and be in doubt whether to assign to it three or four minutes or something less than a second. The moment of experience is not vague, however, when its content is considered; it is then sharply distinguished from all other moments. It is the moment during which experience is sense experience. It is the only moment the experience of which may be analysed by the psychologist as it occurs, and the experience which occurs in it is the only experience which exists as immediate experience.

It is in the moment of experience, therefore, that the mind and the world are immediately related. This moment has duration, and yet all that occurs within it is present, nothing that occurs within it is past or future. It is altogether now, no part of it is then or when. The moment is also distin-

guished by the special character or quality of its content, sensation. This quality is unmistakable, but it is indefinable otherwise than by reference to the experience itself. The moments of our past which we remember, or the moments of our future which we anticipate, contain remembered or imagined or inferred sense experience, in the present moment only is the experience actually sensed.

These are familiar facts, and the problems they give rise to are familiar problems. There is the problem of the relation of psychological to mathematical time, or, as some prefer to state it, the problem of the distinction of mental time from physical time. Also, there is the problem of the ultimate nature of sensation and its relation to other forms or modes of knowledge. These are problems of psychology as well as problems of philosophy, but while psychology is concerned to make clear the distinctions they involve in order to free its subject-matter from confusion (the psychological interest being the definition of terms and classification of empirical facts), for philosophy the problems are vital, they go to the very root of the question of the ultimate nature of knowledge and its relation to reality. The philosophical importance of these problems, and not their mere dialectical interest, should appeal to us. The whole possibility of a consistent theory of life and knowledge depends on the power of philosophy to solve them, and the metaphysical solution seems to me clearly to depend on our power to interpret, or rather to make explicit what is implicit in the concept of a moment of experience.

I will begin with a particular problem on the common-sense plane, a psychological problem which involves no principle of philosophy at all. When we see a shooting star we have the visual sensation of a luminous line drawn across a more or less extensive region of sky. It endures a very short though appreciable time, and, although it seems to begin to disappear at the point at which it began to appear, there is a certain time during which the whole line is simultaneously present to our consciousness, otherwise it would not be experienced as a line. It appears to us, when we describe it, as though a star previously fixed in the firmament,

or having suddenly come into view, had moved across the sky, leaving a trail of light behind it, and that when it had reached the end of its journey and before it had disappeared the whole trail was present to sense. We believe that this is an illusion of the senses : that is to say, that what appears to sense does not actually exist, and that it is explained by the faculty the senses have of retaining or remembering what has excited them. We believe, on what we accept as scientific evidence, that when the trail is present to consciousness, nothing in the physical world is stimulating the sense organs ; in fact, that the trail of which we are conscious has no physical reality external to the organism corresponding to it. We believe that the external reality is a point of light, not a line of light, and that whether the movement of that point is due to its own translation or to the translation of its observer consequent on the earth's movement through space, or to both, the point always was in only one position at one instant and not simultaneously at every position in the line. Were, then, our sensation of the falling star strictly limited and rigorously correspondent to the actual conditions of the physical cause, we should never be able to have the ordinary experience of it. Were our consciousness to begin and cease when the physical occasion begins and ceases, there could be no duration in the psychological meaning, no continuity of the past, no carrying on of the past into the present. Consciousness would be of the instantaneous present and this would be a point without duration.

Assuming the occasion of the sensation to be as science teaches, we have to explain the illusion in the sensible appearance. I can think of only three ways in which a psychologist might suggest an explanation. First, he might suppose that it is due to the mechanism of sensation and that this includes some sort of contrivance such as the photographer's sensitive plate, but not necessarily material —something like what the older psychologists imagined when they called the mind a *tabula rasa*. Our sensations would be of the impressions made upon it, and these being a mechanical effect would not be restricted to the actual

duration of their cause. What we sense would be the marks or impressions left, not the actual cause of them, and these impressions might exist after the cause had ceased to exist. Secondly, he might suppose that the line of light is not a pure sensation but a combination of sensation and memory, that, in fact, it is only the point and not the line which is sensed, and that the line is really made up of our recollections of the sensations of the light when it was at the different points of the line. Or, thirdly, he might suppose, and this is, I imagine, the usual explanation adopted in the text-books, that the mind has a faculty or power of retaining sensations for a short but appreciable time after the excitation has ceased, and hence excitations which physically are a true succession, one past before the next is, may coalesce or overlap in sensation. Some sensations may be simultaneous, at least as to parts of them, although their excitations are not.

I think all three explanations are wrong. What renders them, in my opinion, one and all futile is the assumption which underlies each, that the experience of movement or change is not itself a simple sensation, a single sense-datum, but something which can only be explained as a relation of numerically distinct sensations, or at least of numerically distinct sense-data within a sensation. All sensation, in my view, is of change. Movement or change is immediately given to us in sense experience. The change from A to B is not experienced as two sensations, one of which is " first A " and the other " then B " ; " first A " is not only present when " then B " is future, and " then B " is not only present when " first A " is past, but both are present in an indivisible sensation, and the distinction is an after-result of reflexion and intellectual discrimination. Before I try to formulate and defend this thesis, I will give a specific reason for rejecting each of the three explanations I have indicated.

The first explanation—that we truly sense the line, although there is no line in reality, because the line forms part of the mental picture which represents the reality—is a theory which appeals to common sense on account of a somewhat striking analogy. A moving point, such as we

suppose the shooting star to be, appears as a continuous line in a photograph. This seems to suggest that the retina may perform the same function as the sensitive plate in photography. The analogy is very striking when we consider the structure of the special sense-organs, particularly those of sight and hearing, and the functions of their various parts. A photographic camera is a simple replica of the mechanical apparatus of the eye, by which rays of light from the external scene are condensed by the lens to form a small image on the sensitive retina. In like manner the waves of sound are condensed into vibrations of the small tense membrane which forms the drum of the ear, a mechanism imitated in the receiver and transmitter of the telephone. If the formation of an image of the external scene is a necessary condition of the perception of the external object, and if it is this image which is the object of the sensation, then it seems natural to account for the difference between the inferred cause of the sensation and the sensation by the conditions of the formation of the image. A moving point in the external scene might be supposed to form a line in the image, as in fact does happen when we photograph a changing scene. Is there such an image intermediating between the external reality and the mind? Psychologically there is no ground for supposing it and, so far as theory of knowledge is concerned, no advantage in supposing it.

The problem of knowledge is not simplified by supposing the object of knowledge to be a picture of reality projected on a sense-organ rather than the external reality itself. Philosophically it would complicate the problem of real existence by substituting a representative for a presentative theory. The only ground for supposing that the object of visual sensation is an image of reality and not the reality is the fact that theoretically we can obtain an image behind the lens of the eye and also that if we look into the eye of another we can see reflected back to us the image there formed. But because an image always exists theoretically and because it can be reflected back to another it does not follow that it is, or could possibly be, an object to the mind itself. Not only is the image we may see in the eye of

another person never the image that other person sees, but there is no reason in the fact that we see it to lead us to suppose that the mind must be conscious of an appearance of reality distinct from reality itself. We may therefore reject the view that a picture of external reality is the immediate sensed object and that this picture may have characters which the original has not.

The second explanation is that the line is not really sensed at all, but that only a point in the line is sensed, that the moment the point has moved its position the sensation produced at that spot has ceased and a memory-image has replaced it. It may then be supposed that quite recent memory-images are as vivid as sensations, or so nearly so as to be indistinguishable from them. Hence the line is supposed to be simply a fusion of quite recent memory-images with the actual sensation. Such a view will not stand any psychological test. By every criterion of sensation the line is sensed not memorized. A memory-image is under control in a way that a sensation is not. I can call it to mind, keep it in mind, let it pass out of mind. I have no control over a sensation, I am dependent for it on the actual stimulus of a sense-organ. Judged by this criterion the line is a true sensation, there is no such difference between one point and another as there is between sensation and memory, but the memory-image of the line when I remember it is entirely different in the nature of my experience from the line when I sense it. Were part of the line a memory I ought to be able to keep it and prolong it indefinitely, or at least to keep it in mind until fatigue should overcome me. I cannot do this. There is, moreover, no difference of quality within the line, it is only the duration of the experience which enables me to imagine the possibility of a difference. The mark of sensation is to be actually present experience in the meaning that there is present modification of the organism. As any sensation which endures has a beginning and end, it seems possible to deny that the beginning is still sensation when the end is reached, because it is then past not present. Such an argument would defeat itself by depriving sensation of all

content whatever. The sensation would be merely a point marking the limit of memory.

The third explanation I can best illustrate by a quotation from Herbert Spencer's *Principles of Psychology* (ii. 186). "It is a familiar fact that all impressions on the senses, and visual ones among the number, continue for a certain brief period after they are made. Hence when the retinal elements forming the series A to Z (different sensitive points on the retina) are excited in rapid succession, the excitation of Z commences before that of A has ceased, and for a moment the whole series from A to Z remains in a state of excitement together." The quotation is from an argument to prove that the notion of space may arise out of the notion of simultaneity, and that simultaneity may be the direct sense experience of a rapid succession. It is very apposite to the present case, and illustrates exceedingly well the problem of the perception of change. It seems self-evident that if sensation be instantaneous we must exclude from it whatever is past, and yet if nothing within the sensation is past how can it have duration? Hence the attempt to account for the direct consciousness of change by supposing that sense impressions last longer than the stimuli which excite them, so that a rapid series of stimuli are a true succession, each over before the next is, while the sense impressions they cause overlap and are experienced as simultaneous. (To avoid misunderstanding, it should be remarked that this lasting or enduring of the sensation beyond the duration of the stimulus is not the technical meaning of the terms retention and retentiveness in psychology. Retentiveness in psychology refers to the power of remembering a past sensation, not to the power of prolonging a sensation in present experience.) What then is the reason for rejecting the view that the sensation of the line is due to the retention of the sensations of the points so that some have not ceased when others have commenced? How far it may be physiologically true that the experience of simultaneous visual points, such as the series of points in a luminous line, is due to an excitation of numerically distinct points on the retina I do not know,

but that successive excitations of different points overlap seems to me to bring us up against formidable difficulties. In the first place it supposes the retina immobile, but, as we know, the eye moves, and therefore, if the eye follows the moving point, one point of the retina will be alone continuously excited, and in this case it would seem we ought not to see a line but an increasingly brilliant point. And in the second place, what is still more important, were it proved true of one sensation that in one respect, namely, duration, it does not correspond to its exciting cause, what ground should we have to argue that it corresponds in any respect ?

In my view the explanation of the appearance is neither physical nor physiological but psychological. We are conscious of a rapidly moving luminous point as a line of light, not because all or some of the points in the successive series excite sensations which overlap the other points in the series, but because the whole series is within the moment of experience and therefore a present sensation. The moment of experience is limited in duration and limited in discrimination, but within the moment every point of a series, whether it be within or beyond the limit of discrimination, is present to sense, whatever be its relation of before and after to the other points of the series. A point or instant is not past because it is before another which is present, nor is it only present when the preceding member of the series is not present. It is present while it remains within the moment of experience, and so long as it is present it is not even fading away. The moment of experience has within it no distinction of past and present, but it has within it the distinction of before and after. The limit of its duration is where memory takes the place of sensation, the limit of its discrimination is where before is indistinguishable from after. Within the moment, whether the interval separating two points in a succession is discerned or not, each point is present and sensed, no point is remembered or imagined.

So far I have not touched on philosophical difficulties, I have tried to think how psychologists might deal with

a purely psychological problem without raising questions of the validity of knowledge. Before I leave the psychological consideration I will try and indicate exactly in what the difficulty lies and what to me seems the way of escape. A sensation is only, wholly, and always, present. The object of a sensation, the sense-datum, has for its essential mark that it is given at the present time. Yet though it is present it seems that it must have within it what is not present but past. A movement or change may be a sense-datum, for we know movement or change as present fact, and not as inference from present fact. A sensation whose sense-datum is a movement must have duration, what has duration must begin and end, beginning and ending cannot be simultaneous, one is before, one is after, the other. But, as we have seen, a sensation is altogether and entirely present, therefore the beginning and ending, the before and after, within the sense-datum must be together and simultaneous. There is here undoubtedly a metaphysical problem which I will state directly, but it need not disturb the psychologist. In the sensation of the shooting star the line of light is not an illusion, the movement is a sense-datum, and a movement can only be present in a sensation as a line, for it is indivisibly and wholly present. To suppose that the sensation of movement is not really one sensation, but an infinite series of sensations, in each of which a different point of space is sensed at a different instant of time, is not only a psychological impossibility but a denial that movement is a sense-datum at all.

Consciousness, then, is the experience of a present actual now, this now is momentary, and the succession of these moments is a time series. Also the object, the reality of which we are aware in consciousness, is a succession of events, each of which has its moment of present existence, and the succession of these moments is a time series. But there is a difference between the moments of consciousness and the instants of physical events. The difference is in what we name duration. The moments of consciousness endure. The now of experience is not a point or division between what is past and what is future in the time series, but a

time span with definite content. It holds within it what in the physical series may be already past or even not yet. This present actual moment of experience has been called a specious present to distinguish it from a mathematical present. A specious present is a reality of psychical nature with no counterpart in the physical universe, and whenever we represent it as existing physically we find that we are in fact introducing into nature what has meaning only in consciousness.

The specious present or moment of experience is the moment in each conscious subject's experience which while it endures he calls now, and within which are his sensations. It is the grasp or apprehension of a reality ceaselessly flowing away and ceaselessly being renewed. It is not a moving point, it resembles rather a field of vision with fixed limits, across which a panorama moves. The quality of the moment is to be wholly now. It is distinct from past moments which were once now, and from future moments which will be now. We feel to this present moment that it alone is, and that all that really exists is in some way in that moment, while all past moments are known as a memory of what was and all future moments as an imagination of what will be. Yet this " specious present " is not a boundary line between past moments and future moments, it is itself an actual duration, and therefore has difference within it, as well as being itself different from what is excluded from it. The distinctions within it are of two kinds, which by a natural analogy we think of under the forms of time and space. The duration of the moment involves a time distinction within it. The extension of the moment, that is to say, the diversity of its content, the fact that all the different senses present objects to the mind in one and the same moment, and the fact that the mind in attention can select one or another, can wander over a practically unlimited field, can turn aside from sense to memory and imagination, all within the moment of experience, involves a distinction which can only be presented as spatial. Mental activity in all its wide range falls within the specious present.

It is very important, at this point, to be on our guard

against a loose meaning of the phrase, the specious present. In ordinary discourse we speak of long and indefinite periods as present, whenever these periods form part of the unity which the action in progress supposes, or when they embrace the whole set of conditions of a present activity. Thus we speak of the present conversation, the book we are at present reading, or we may include vast periods of time as when we speak of the present age, the present geological period, or the present condition of the solar system as compared with its supposed condition in a nebula. This, of course, is not for our consciousness the specious present. Yet this application of the term present has an important bearing on its notion, for our very power to think these vast periods as present depends on our power to imagine a mind for which they would be a moment of experience. In effect we imagine the present moment, in which feeling and sensation are immediate, so extended as to embrace these long periods. And also our imagination serves us in the opposite direction. We can suppose our specious present contracted to exclude all but an infinitely small portion of its content, so that the other portions should be relegated to a past or a future as vast as the periods to which we have just imagined it extended. Just as in the words of the Psalmist, "A thousand years in thy sight are but as yesterday when it is past, and as a watch in the night," so also is it equally true that yesterday may be as a thousand years. We cannot mean, then, by the specious present some definite quantity of abstract moments, for there are none; we must mean some constant ratio of conscious apprehension to the variable moments which form its content.

Let us suppose that we are looking through a microscope, and let us suppose also that our (theoretically perfect) instrument has an adjustable objective, so that any object under observation may be indefinitely magnified. The field of vision will not vary, but will remain constant both in duration and extension whatever is within it, but less or more of the object will come within the field as the magnification is increased or diminished. That is to say, whether

in relation to unassisted vision the magnification be 50 or 500 diameters, the field is the same, the time required to attend to anything within it is the same, the number of parts or divisions in it is the same ; all these are constant, and what is variable is the quantity of the object which will come within the field. This constant field of vision, irrespective of the varying quantity of the object observed, illustrates the nature of the specious present. But we may get a better illustration still. A microscope effects only a visual magnification, and the difference between an object seen under the microscope and the same object as it exists for unassisted vision is experienced as a discrepancy between sight and touch. Imagine, then, that some instrument could be contrived which would effect an exactly corresponding increase or decrease in the discrimination of all the senses to that which the microscope effects in the case of vision. Suppose that such an instrument were not limited as the microscope is to magnifying the object so that less of it occupies the field but could also diminish the object so that more of it would occupy the field, and suppose that with every alteration of visual magnitude there were an accompanying corresponding alteration in the tactual, auditive and other senses and, with every alteration, a constant field. Such a field in which all the senses would be co-ordinated is a fairly exact analogy of the specious present. If we had such an instrument it would enable us to pass from our system of reference to any other we might choose and to preserve our identity through every change. By making a larger or smaller quantity of the object of our present experience occupy the constant specious present of consciousness and by adapting all our senses to the alteration, it would be as if we ourselves became proportionately larger or smaller in relation to our normal world.

The moment of experience, or the specious present (the two terms are for me synonymous), is then the span of consciousness throughout which the reality known is immediately present as sense experience, and within which the activity of the mind in sensation, memory, and imagination, is in being. Theoretically there is no limit to what may

occupy this moment, but the moment is itself constant and not variable, however variable in extension and intension its content. This content, however, though theoretically unlimited, is practically defined in its range by our organization, and by the mode of our activity, to a certain system of reference. Thus my whole life from my birth might conceivably be the content of one moment of experience, that is to say, it might be entirely present to me not as memory but as immediate experience. This would not imply the enlargement of the moment of experience but a variation of the system of reference. This at least is the view I hold. Against it may be urged the undeniable fact that we are able to and actually do measure this moment of experience by a purely objective standard. A certain definite period of our clock-time enters it, and neither less nor more. My reply is that such measurement does not determine the moment of experience, but the system of reference within which and in relation to which the consciousness is functioning.

Whether the view of the moment of experience which I have just given, that it is constant while its content is variable,—not in the sense that it is a series or succession of ever new experience, but in the profounder sense that all its objective characters, including space and time, are variable, and relative to a system of reference,—be accepted ; or whether the ordinary conception of an absolute space and time and a variable moment of experience be held ; in either case the concept of a moment of experience gives rise to fundamental problems of philosophy. These problems fall naturally under two heads, one formal, the other material. One is the problem involved in the duration of the moment of experience, the other in the nature of its content, that is, of sense-data. The first problem is the relation of psychological duration to mathematical time, the second is the problem of the status of a sense-datum.

It is evident to every one who reflects that the moment of experience is not the mathematical instant which divides the past from the future. It is quite obvious that while the mathematical instant may fall within the moment

of experience, the latter cannot fall within the former. The reason is clear. The mathematical instant is a point, the moment of experience is a line, the first has no dimension, the second has one dimension. If mathematical time be represented as a series of instants, one of which is present and the others of which are past, then the moment of experience holds within it some instants which in the mathematical series are past, and these in the psychological series are still present. This I think no one disputes. But the mathematical instant is also the limit of a series or succession of instants which are future. Do any of these future instants fall within the moment of experience, so that some instants which in the mathematical series are future, in the psychological series are present? Or, is the present mathematical instant the limit of the series of instants which falls within the moment of experience, so that in respect of all future instants the mathematical and psychological series correspond in a present point common to both? This latter alternative is the generally accepted view, because, while it seems there are many forms in which instants mathematically past may be psychologically present, it is difficult to conceive any form in which instants mathematically future can be present at all. Mathematically future time seems therefore definitely excluded from the specious present. Does, then, the future differ from the past in such way that the one cannot while the other can exist in the present?

So far as the concept of mathematical time is concerned the future is on the same plane as the past. So far, that is to say, as we consider physical events determined by a time order, forming a series standing to one another in a relation of before and after, there is no difference in our concept of time future and our concept of time past. If we suppose that some micromegas of a supra-world, for whom our sun is an atom, were to cause the earth to fly out of the solar system as an electron may be shot out of an atom, it would upset all our astronomical predictions no doubt, but it would not affect our concept of time future. If, then, the moment of experience overflow the mathematical instant, there is no *a priori* reason why it should be

only over the series behind us and not also over the series before us. Yet it seems difficult, and even in a certain sense paradoxical, to suppose that the present moment of experience can embrace instants mathematically future, as well as instants mathematically past. Why? I think it is due to an assumption. We naturally and unconsciously assume that the mathematical instant is original and independent of experience, and that the moment of experience is the comparative failure of consciousness to grasp or apprehend this reality in its purity. The moment of experience is then the more or less successful attempt to get a sharp focus of a reality which itself possesses ideal precision. On such an assumption there are two very strong reasons for holding that the moment of experience is the stretch of time from the present mathematical instant back through a certain series of past mathematical instants and never forward into the future. The first reason is the law of parsimony. If the mathematical instant is what consciousness is striving to grasp, everything which can be excluded from it will be. In other words, experience will strive to make its moment coincide with the mathematical instant, and so far from darting in front of it will lag behind it as little as possible. The other reason is that the past mathematical instants, having already been experienced, can be retained in the present, whereas future instants, not having occurred, cannot be retained.

It seems to me that to assume the independence and originality of the mathematical instant is without any justification. Also it leads to a kind of absurdity, for if the mathematical instant be real then the real has no duration, and the experience of duration is illusion. There can be no ground for such an assumption, just because experience is itself the highest court of appeal. On the other hand, to hold that the moment of experience is original and absolute is not an assumption, because experience is itself the ground of all implications, inferences and assumptions whatever. The mathematical instant is not an absolute reality, because in the first place it is abstract, not concrete, and in the second place it is part of an intellectual scheme.

This scheme is a device by which we represent reality. If reality be activity we can only present it to the mind as a continuity of change, and this must appear as a division between what is formed, or acted, or made, and what is forming, or acting, or making, and the moving centre of the activity will be represented in thought as a point or limit dividing past and future. The point will be the ideal abstract centre of the activity, and the moment of experience will be the concrete concept of the activity, and will therefore of necessity hold within it something which in the abstract is past, in the sense that it is before the abstract centre, and something which in the abstract is future, in the sense that it comes after the abstract centre. But only in the abstract meaning of mathematics will past and future be distinguishable parts of the moment, and, as so distinguished, past, present and future are unreal abstractions synthesized in the concrete concept.

We are not, however, entirely dependent on analysis of the concept of present activity to prove that mathematical instants abstractly future form part of the moment of experience. There are actual facts of experience which are difficult to explain if it be not so. In the case of all expressive action—gesture, speech, writing, etc.—the whole meaning to be expressed is intuitively present in every moment of the expression as it proceeds. Were it otherwise, we should be in the impossible position of striving to express what did not exist to be expressed. A musical melody, a proposition, a sentence, even an exclamation, will occur to every one as cases in point. If, then, expression imply intuition (I am not using the word intuition here in a technical sense), it is impossible to schematize the moments of the expression unless they can advance beyond the mathematical present instant. For example, can I suppose that when I am pronouncing the word "London" the second syllable is not within the specious present until I have completed the pronunciation of the first, although the first is admittedly within the present when I am pronouncing the second? Psychological analysis of the act of reading has brought out the fact quite convincingly

that mental apprehension is always ahead of the actually sensed word.

There is also another familiar experience which appears to me to throw considerable light on the nature of the duration of the moment. Every one has probably at some time had the experience of being awakened from sleep by some sense-excitation, such as a knock at the chamber door, a word spoken into the ear, or a touch on some part of the body, and experiencing this sense-excitation as the conclusion of a long, intricate and complex dream. Unless we are to suppose in such cases a miracle of coincidence, we know for certain that the sense-stimulus was the occasion of the dream of which it seemed to form the natural climax. Does not this show that a long-enduring psychical experience can take place during what in normal waking life we call a moment, and also that this duration can appear to the mind as preceding the event which we afterwards know has occasioned it ? The least such facts show is that we can have no more ground for excluding future instants from the moment of experience than we have for excluding past.

I will now try and present the problem of the duration of the moment of experience in complete dialectical form. The concept of duration has formal diversity or difference within it. This difference consists of two elements, past and future, each of which in the abstract, and apart from the unity of the whole concept, is a pure negation. The past is not, the future is not, and all that is not past is future, and all that is not future is past, there is no present. The concrete concept in which these contradictory elements are synthesized is the moment of experience. The formal problem therefore may be solved in the manner of the Hegelian logic. We have a dialectical triad exactly fulfilling the conditions of Hegel's first concrete category, in which becoming is the synthesis of being and nothing. Let us give it the full Hegelian form. The thesis is the duration we affirm to be present. The antithesis is the past and future of which all duration entirely consists, and both are opposite and contradictory to the idea of present. The synthesis is experience, every moment of which holds

together the abstract contradictions of thesis and antithesis in a concept which is concrete, universal and real. But this is only a first degree of reality. The moment of experience implies more than bare union of the abstract contradictions, past and future, in a duration span. It implies a higher concept, that is the concept of a higher degree of reality, in which past and future are not independent elements, held together by the external relation of the apprehending consciousness. This higher degree of reality we find in the concept of activity. The moment of experience is the moment of conscious activity. In the concept of activity, past, present and future are a systematic unity, essential elements of an organic whole. The elements are organically present in the whole, that is, the past is not merely past, it is contained in the present, and the future is not merely future, it is being fashioned in the present. Past and future are therefore in the concept of activity no longer abstract contradictions, but essential to the unity of the concept. Before I attempt to point out the further implications of the concept of activity I will consider the second problem I indicated, that which concerns the quality or matter of the moment of experience, as distinct from its quantity or form.

The moment of experience is one of a series of moments. We distinguish it from the past moment we remember and from the future moments we imagine. So viewed, it appears to us to endure so short a time that we find it practically impossible to realize that it is, before it has already passed into the series of moments which can only be remembered. Yet the fact is that as experience the moment is continuous, it is only from the standpoint of its content that it is for ever ceasing and for ever being renewed. The objective mark of the moment of experience is therefore the special nature of the content. It is only in the moment of experience we have the kind of knowledge we call sensation. Every one recognizes it and knows that it is different from every other kind of knowledge whatever. All knowledge is, for the subject of experience, within the moment of experience, even the kinds of knowledge we call memory and imagination,

but the objects to which memory and imagination or fantasy refer are not within the moment of experience as the objects of sensation are. The object present to the mind in sensation is therefore named by some philosophers the sense-datum, and the moment of experience is defined by them as the period of time within which an object must lie in order to be a sense-datum.

The problem, then, is this: Are sense-data objects in their own right, objects which stand to the mind in a relation of direct acquaintance, and is it these objects which give to the moment of experience its privilege? Or, is it the nature of conscious activity, the nature of the mental grasp or apprehension of reality, in a word, the nature of life, which gives to the moment of experience its special character of unmediated reality? According to one view sense-data are certain definite objects which at a certain moment are or may be present to a mind, and the moment we call now, or the specious present, is distinguished from other moments before and after, by the fact that it is the only moment in which sense-data are so present. We need not object that the moments are described in spatial terms, there is no other way of expressing the meaning, for in this view sense-data are not events which occur, but objects which appear. The opposite view is that sense-data have no independent status: they cannot be treated as a class of entities separable or distinguishable from the moment of experience as its apprehended content, for there are no objects which are not events.

Let us be clear, too, as to what the problem is not. It is not the question of the real existence of physical objects, nor is it the question of the validity of the inference from phenomena to a cause of phenomena. It is not, that is to say, the question of the independent existence of the objects or material things which physical science is supposed to require as its postulate, nor is it the question whether the fact of sensations involves the concept of an independent cause of sensations. Sensation so far as we are concerned is ultimate fact, it supposes a sensing mind and a sensed object, these are part of its notion, but it does not necessarily

suppose that either mind or object is anything at all outside or independent of the sensation.

Let us then consider the quality of the moment of experience, sensation. If we analyse sensation into act of sensing, sense-datum, and relation of acquaintance; or, into subject-mind, object-datum, and knowing-relation; or, in any way which enables us to treat the sense-datum as constant and the relation as variable, we have a psychological difficulty which it is impossible to ignore. This is that the variety and multiplicity of sense-data, and their quality or character in the moment of experience, are not due only to the variety, multiplicity and character of the sense-excitations, and the multiplicity is not only due to the amount of clock-time the moment covers; there is a qualitative and quantitative difference in sensations themselves depending on the nature, organization, situation and special function of the sense-organs. To the ordinary view this offers no difficulty, but on the other hand serves to explain many facts. We classify sensations by their source in the different sense-organs before we classify them by what we may call their apport. But the apport is everything, is fixed and absolute, if the sense-datum is constant, and independent of the act of sensing.

There is a still greater difficulty for the view that sense-data are constant, in the fact of attention. The mind can be attentive or inattentive to its sensations and in any degree. I may listen to what some one is saying, my eyes the while fixed on his gesture and action, and be wholly inattentive to what I am seeing and attentive only to what I am hearing, or wholly inattentive to what I am hearing while attentive to what I am seeing, or I may be actively attentive to both at once. In fact I can turn my attention off and on, I can concentrate it on one minute sensation or expand it to take in the whole range of my senses at once, and all within the moment of experience. How am I to express all this if I take the standpoint of objective sense-data to which the relation of the mind is acquaintance? A sense-datum can admit no difference of degree, nor yet can the relation of acquaintance. But attention introduces an infinity of

degrees in my actual sense-data. The difference between attention and inattention will, on the view I am considering, have to be explained away as an illusion or subjective appearance, for the difference apparently due to attention must be an actual difference of sense-data themselves.

This leads me to my chief criticism of the sense-datum theory, I mean the theory that a sense-datum is constant. If we adopt it we cannot possibly explain the perception of change, and we must suppose that what we perceive and call change is not what we conceive change to be, but an illusion produced in us by the succession of sense-data. What we suppose to be change must really be the simultaneous sensing of sense-data which are themselves successive. And there is another fact which we cannot explain on this theory, the special privilege which attaches to the moment of experience. This moment stands out in our lives not only as possessing special and overwhelming importance to ourselves, because in it we are acquainted with the objects which out of that relation we can only describe, but because into that moment is crowded the whole of reality. Outside that moment there is only what did exist or will exist, nothing that does exist.

These two facts, first that in the moment of experience we perceive change, and second that into this moment of experience in some way, not only our own reality as minds knowing, but the reality of things known, is gathered, demand of human thought that it should seek to discover their metaphysical ground. They present to us a problem which can only be solved by the method of philosophy. This method is the analysis of the concept to discover its implications, then to follow those implications into the system which gives us their reality in a higher degree.

We have seen that in the concept of activity the contradictions to which the duration of a present moment gives rise are overcome in a systematic unity. Activity implies that past and future are together in organized union in the present. The moment of experience is the moment of activity. The concept of activity implies change. Change is not mere succession, the alternation of existence and non-

existence, it is becoming, the becoming actual of what was potential. Change implies continuity. The new creation which constitutes it is the new form or order which the old undergoes. Where there is real change, existence and non-existence have no place as categories of reality. The categories of change are, making, acting, doing, opposed to which are, made, acted, done. If reality be change, reality cannot cease to be, cannot give place to nought. The absolute expression of it is "making itself." Past and future are therefore no longer the distinction of what is not from what is.

We have an illustration, we might even say an exact application, of this metaphysical doctrine in the scientific concept of energy. Energy is in modern scientific theory the ultimate concept of reality, and the law of its conservation is not a description of facts nor is it the formulation of a probability based on the observation of invariable sequence. So far as empirical facts are concerned, they are diverse, disconnected, independent of one another. We can classify them more or less conveniently; group them into the phenomena of light, heat, electricity, magnetism, etc., we can even, by observing sequences, predict them with more or less confidence, but all that experience warrants us in saying is that they are or that they are not. Physical science has replaced this idea of existence and non-existence with the concept of a reality which cannot not-exist, and which preserves its identity throughout complete change of its form or order. When energy completes its cycle of change it does not cease to exist, it passes from the kinetic to the latent order. It may be said that this concept of conservation is not a fact but only a convenient generalization. It is a generalization, however, implied in the very possibility of physical science, and which cannot be even called in doubt without destroying the basis of scientific explanation.

Strict empiricism would in fact as effectually destroy physical science as it destroys philosophy. Observation of fact which abjures implication is sterile. So in philosophy, if we be content to conceive reality as a panorama or moving

procession and the mind as a spectator contemplating the passing show, then the moment of experience has no intrinsic privilege, its apparent privilege is due to the fact that it happens to be the moment at which we are spectators, and our sense-data are what happens to be offered to us at that moment. But conceive reality as change and one moment is at once raised to the privilege of actuality with respect to every other moment.

The concept of change appears to me, therefore, to be of capital importance in philosophy. If change be original, that is to say, if change be the necessary logical antecedent of things, and if fixity in every form be the work of the mind, and if it be this original change which we perceive in the moment of experience, then both the nature and the form of that moment are made manifest. The moment of experience is the moment of activity ; activity is the moment of change ; change is the continuity of the past in present creation. Change is not succession but self-making. The apprehension of change in a moment of consciousness implies therefore the holding together, in that moment, past and present, and past as present, an activity of self-making or creation. This is the concept of life.

This concept of life is the highest concept we can reach, for in it we grasp intellectually the reality we know intuitively. In the moment of experience we live as well as know, and we know in living the very reality we objectify in knowing. The whole process of living thought, as distinct from the life itself, is the making explicit, the expressing in the concept what is implicit in the intuition. But as intuition life is all-inclusive, whereas the moment of experience is essentially exclusive. It is an infinitesimal fraction even of our individual life, whatever be its relation to universal life. The moment of experience is the concentration of consciousness on a small and quite disproportionate part of the full reality of the individual life of the conscious experient. What is the principle of this concentration of consciousness on a fraction of the whole, or of this contraction of all reality into a moment ? The moment of experience is the moment of attention to life.

The moment of experience is for us a moment of consciousness. When we speak of our conscious moments we distinguish consciousness from life, and consciousness then appears to us as a form of vital activity, a phenomenon which supervenes on life itself. The moment of consciousness is not a moment of life, that is to say, life is not a multiplicity of moments or composed of momentary elements, some conscious, some not. An infinitely small portion of the individual life comes within the moment of consciousness when compared with the duration of memory and the extension of sense perception. In the activity of attention consciousness moves over a wide range of past and present, lighting up in its brief duration some selection from the memories of past experience, some selection from present sense experience. Life is itself infinitely wider than consciousness, and the moment of consciousness is not the moment of life but the momentary consciousness of life.

If, then, we recognize that consciousness has supervened on life, and ask ourselves what is its nature and its relation to vital activity, two views are possible. We may suppose that consciousness is just awareness, and that the life which has acquired it has thereby endowed itself with a power of contemplating and representing itself and its environment. In that case the momentary character of consciousness will be altogether mysterious, a fact to be accepted but impossible to understand. On the other hand, we may see in its momentary character its true significance. Consciousness is momentary because it arises at the call of a certain kind of activity. It is as it were a light shed on the focus or centre of activity to serve the action going forward. The terms we have to employ—light, focus, centre, etc., are of necessity metaphorical. Consciousness is the unique experience we know as awareness. There is nothing contradictory in supposing that our whole life with its continuous past, its full present, and its prospective range and activity might be through and through conscious, an awareness evenly dispersed over the whole range of activity, not concentrated round the focus, but such consciousness would not serve the mode of activity

for which our whole organization seems contrived. This organized activity requires that all which does not interest the particular action we are engaged on shall be shut out from our consciousness in order that attention at the centre may have full illumination. Biology confirms this. It shows us, throughout the whole range of life, species organized for characteristic action within a definite zone or sphere of activity. Every living creature is fixed in an attitude of attention to life, an attitude bending it forward to the action which is forming before it, closing behind it and shutting out from its consciousness whatever is not calculated to serve or to contribute to the efficiency of its special activity. To the extent that its action is chosen and free the life must become conscious, and the mode of this consciousness determines the range of its freedom, and the form or mode of the activity conditions the objective order of reality in the experience.

We are able then to deduce the momentary character of consciousness from the nature of life. But on the other hand our whole knowledge of life rests ultimately on our experience in the moment of consciousness. It is only, therefore, by the implication of the concept of a moment, itself an actual experience, that we reach the concept of a reality wider and more fundamental than the moment, yet identical with it. This reality is life. It is the philosophic concept of an original activity, not conditioned by the moments of experience, which are the form in which it comes to consciousness, nor by the content of those moments, that is, by sense-data which are the objective aspect of the experience, but itself conditioning the order of experience and the content of experience by the mode of its own activity. We reach the concept by the same process which led Kant to affirm the reality of the thing-in-itself, but unlike the concept of Kant it is not a reality by its very definition unknowable; on the contrary, it is known in its immediacy and its form is not arbitrary but deduced from its nature.

There is the alternative theory. We may say, and many philosophers do, that what is implied in the moment of

experience is not an original activity creating an objective order, but the independent reality of an objective order. The moment of experience in this view brings the mind into direct relation with the real continuity of a spatial and temporal order and with an arrangement of physical elements within that order. This seems to agree with pre-philosophic common sense. It is well, therefore, to follow out the logical consequences of such a theory.

In order to appreciate this alternative theory let us briefly recall the fact. We all acknowledge that normal experience consists of a present moment which endures for a period variously estimated to occupy from 3 to 12 seconds of clock-time. Within that moment we discriminate spatial extension and temporal duration. There is a limit to the discrimination, and many laboratory experiments have been devised for the purpose of determining it. It is said, for instance, that for the visual sense the extreme discrimination is an interval of $\frac{1}{500}$th of a second. The character or quality of the moment of experience is sensation. It is only in that moment that we have sensation. We perceive and remember in that moment, but it is the sensation, to which what we perceive or remember is attached, which gives the moment its distinctive mark. The whole content of that moment is distinguished as present experience from what is past and future, yet within it, though all content is present, there is a distinction of before and after. This in general terms is the scientific and psychological description of the fact we name the moment of experience. What, then, is the problem? The problem is the nature of the unity of the moment and of the continuity of the elements we discriminate within it. If the reality be the three to twelve seconds of mathematically measured instants and the definite number of sense-data this period covers, then the moment of experience is nothing more than the limit of the mind's span of an objective succession. The continuity of that moment will be the mathematical continuity of points in a line and instants in a succession. The continuity of an extension in mathematics means that between any two points another

can be found, so that there is never a next point to any point, and similarly the continuity of a duration means that there is never a next instant to any instant, but that between any two instants another can be found. What, then, is the logical consequence of adopting this view? It is that there can be no numerical identity between the moments, the series or succession of which corresponds with our lives. The reality of life must consist of a series of distinct movements, whose instantaneity and continuity are mathematical. Life imaged as psychical duration must be an illusion.

This then is the position to which the alternative theory leads. It was, I suppose, practically the position of Descartes, of Malebranche, and of Berkeley, and it did not dismay them, but then they could fall back on the philosophical concept of a deity. Each perishing instant called forth in their view a new act of creation by God. But there is no place in present-day philosophy for such a concept. It is not on this account that I reject it, but because mathematical continuity and scientific causality seem to me wholly insufficient factors to account for the living activity I am directly conscious of in the moment of experience.

Consciousness, then, in its special form of knowing or awareness, illuminates our activity at the central point of progressing action. It is concentrated in a focus of attention when the activity is intense and the situation is novel. It is dispersed and relaxed when the situation is familiar and the action automatic. There is a zone of consciousness within which knowing is sense experience. This is the present which we distinguish from past and future. Mathematically the present is a point without duration and without special privilege; the last instant of a series going back into the past and the first of a series going forward into the future. Psychologically the present is a duration, very brief in comparison with the vista of the past and the prospect of the future but with definite content. The moment of experience is a specious present; it is not an instant without duration but a determinate span of duration.

The moment of experience enables us to understand how history can be altogether present. The moment of actual sensing has beginning and end, its parts are all in the relation of before and after one another, yet the whole moment is distinguished by its content as present existence from past and future moments. In the moment of experience before and after are not past and future but altogether present in the meaning that they are sensed and not remembered or anticipated. There is nothing absolute in the limitations of a moment of experience, yet the moment is circumscribed and its circumscription is in fact specific in living creatures. It is relative to the range of activity. It is the moment of attention to life and the point of insertion in reality. The moment of experience with its grasp of duration is an essential condition of activity. The concept of activity presupposes the past retained in the present and forming the future. Organic activity is the past acting in the present. Activity is inconceivable as mathematical continuity. The beginning and end of an action are not divisible into separate events and the action cannot be dissolved into a series of instants. There is only activity where the past is present with a hold on the future.

Reality is history and history is self-creative. We see the process in being in the moment of experience. Knowing is not awareness of what is or is not, but the grasp or apprehension of becoming. In the immediate knowledge of the moment of experience, what we are aware of is change, and the object of awareness is an event.

CHAPTER VII

MEMORY THE FUNDAMENTAL FACT IN EXPERIENCE

To touch the reality of spirit we must place ourselves at the point where an individual consciousness, continuing and retaining the past in a present enriched by it, thus escapes the law of necessity, the law which ordains that the past shall ever follow itself in a present which merely repeats it in another form and that all things shall ever be flowing away. —BERGSON.

THE moment of experience is a true duration. It is not a succession of instants one of which alone exists while the rest are non-existent and remembered or not yet existent and anticipated. It is true duration because within it the whole content is present and existing. That is to say, there cannot be within the moment of experience a distinction between what exists and what does not exist, for to exist is to be within the moment of experience; to be present, or now. Psychologists, as we have seen, have recognized this fact, to a certain extent, in the theory of the specious present, but only partially and without accepting its full significance. It is clear, for example, that an event, however brief its duration, in order to be an event must have unity. It seems, however, that this unity can only consist in the mental image the mind forms of the event. For an event has beginning and end, and these cannot be simultaneous, they are the first and last instants of a series of constituent instants which in reality are essentially discrete and unconnected. Physical science seems to confirm this, for the briefest period in which we can discriminate an event as a unity (for a visual event something approaching the $\frac{1}{500}$th of a second) is demonstrably composed of hundreds of billions of discrete events and there is no possibility in thought of

setting a limit to this discreteness. If an event be thought of in this way, if we distinguish the discreteness of its instants as its reality, from the mental image as its unity, then we are forced to the absurd conclusion that in reality nothing exists, for all the component instants of the event apart from the mental image are past or future and therefore non-existent, and the present is only a limit between the two series and therefore neither an event nor part of an event. Psychologists have recognized the impasse and in the theory of the specious present have reformed the concept of an event. The now of experience is not for them the mathematical present instant, it contains with this a bit of the past and a bit of the future united or held together. But if past and future are non-existent their union will not produce existence. Adding nought to nought will yield nought. In other words, if the event be real and be constituted of discrete elements, the discrete elements must be existent not non-existent. If past and future are non-existing their union or inclusion will not constitute an existing present.

Is there not however a way of getting round the difficulty? It is not, it will be said, the actual past and future instants which are held together in the specious present, but their apport or content, which the mind retains in an ideal form when they are non-existent. Let us admit that the past was but is not, that the present is without duration, and that the future is not but will be; have we not the fact that the past has been, and the future will be, and may not the present be the actual passing of the will-be into the has-been? Is not this fact, which in the moment of experience we may be said actually and directly to observe, enough to constitute the reality of the event? This is not a way of escape. An event is wholly existent and wholly one, it is not partly existent and partly non-existent. What I perceive as existing now is not made into an event by my remembering what existed before. Something more is necessary. The actual past must be existing in what is present. It admits no breach however infinitesimal. Equally it holds that the

future not merely will be but is actually existing in the present. Let past and future be in any sense non-existent, or, if you will, non-present, and the event is non-existent. Posit the mind and over against it a formless manifold, suppose the mind the sole agent, support, and substance of events, and then the events indeed may be considered as composed of non-existence, but the mind is wholly present and existent, and the problem of past, present and future arises immediately in regard to it. Or again we may conceive God performing the function which Berkeley conceived necessary, keeping our perceptions in existence when we are not perceiving them, but then again we shall have the problem of past, present and future in the continuity of God. Try in what way we will, we shall find it *a priori* impossible to constitute existence out of non-existence.

We are all acquainted with reality in the fact that we are living, sensing, thinking, willing, acting, beings. It certainly seems to us that the primary characteristic of this reality is that there is a present moment sharply distinguished from past and from future moments, and this sharp distinction seems to lie in the fact that the present is existent, the others non-existent. We are sensible of the present, we remember the past, we imagine the future, but our memory of the past and our anticipation of the future are both within the sensible present. So then even if we admit that in a sense within the moment of experience past and future are present and there is no distinction of existence and non-existence, yet between the moment of experience and other moments there is the fundamental distinction between existence and non-existence. Clearly if there be no difficulty in conceiving the moments external to the present moment as non-existing, there can be no difficulty in thinking the instants within the moment non-existing. Is it then a fact that between the moment of experience and the preceding and succeeding moments there is this distinction? Directly we face the problem from the point of view of the concept of life we see that the concept of past, present and future as a distinction of existing from non-

existing moments is a contradiction. The concept of life involves the existence of past and future in a present moment and involves their existence not in the shadow form of memory-images and ideas but in the concrete and comprehensive and fundamental meaning which we give to the word existence. How come we then to view reality as a passing of existence into non-existence and a coming of non-existence to existence? How come we to class past, present and future as a series of moments distinguished fundamentally by the predicate of existence? It cannot be a fundamental distinction in reality but it is a way in which by our very nature and the mode of our activity we view reality. It is an artifice or device which characterizes our intellectual mode of activity, and in proof that it is not fundamental we need only appeal to the logical principle itself, *ex nihilo nihil fit.* It is unthinkable that non-existence can be the ground of existence.

What then is the fundamental fact in experience? If the foregoing argument is sound the fundamental fact in experience is memory. But in this case memory is not a faculty which some species of living creatures have acquired; it is real existence and the basis of living activity. Conscious experience depends on memory as its condition. By this is not meant merely that knowledge implies a power of remembering the past, much less that memory is the present recollection by the mind of the non-existent past; what is meant is that memory is the actual and active existence in the present of what has been acting and indeterminate, but now is acted and determined. Memory can no more be detached from experience and experience remain, than the stuff of which anything consists can be detached from the thing which consists of it.

This is not a view that we find at all easy to accept. It seems opposed to the plainest direction of the science of the mind. It appears self-evident and clear to the most ordinary reflexion that the fundamental fact in consciousness must be sensation. Almost instinctively psychology begins with the description of sensation, and it not only seems that nothing is more ultimate and more fundamental, but that it could

exist unsupported and is itself the basis of all experience and the primitive psychical fact out of which the higher powers of the mind have been evolved. We may discover that sensation depends on physiological conditions of organization; that it comes late if not last in the biological order; but so far as knowing is concerned it is first, the foundation from which all knowledge is raised, and last, for the ultimate constituents into which the most developed knowledge can be resolved are sensations. The primary purpose of sensation appears to be responsive action by the organism, and this seems to develop into a higher power, that of perceiving present existing external reality; and superposed on perception, as a kind of extension of it, there seems to have been developed the still higher power of memory, which by enabling us to retain the perception in the form of an image or idea, gives us the means of organizing experience. The order of genesis of experience seems therefore to be, first, sense impressions accompanied by specific responses; second, the perception of the objects which are the occasion of the sense impressions and the formation of images; third, the retention and recall of the images formed in perception. And this last endowment of the organism, memory, enables us to organize experience into systems of science which give us control over the environment. This seems to us not only the natural order in which the special phenomena of conscious experience have evolved, but the very principle of evolution itself which proceeds from the simple to the complex.

Why then are we called on to reject this clear and straightforward account, supported as it is by the whole of natural science, and the whole of mental science as represented by psychology? Because we find that it will not stand the test of a philosophical principle. When we submit this process to philosophical analysis we discover, generally to our astonishment, that not sensation but memory is the fundamental fact in experience which conditions everything. Perception is then seen to depend upon memory and not *vice versa*, and sensation to depend on perception. It seems a paradox. It seems equivalent to affirming the con-

tradictory proposition that there may be memory (not merely as a potentiality, but as an actuality) when as yet there is nothing to remember. When however we analyse the concept of perception we see that what is essential in it is recognition, and recognition supposes memory. This problem of recognition is a problem of philosophy for it is concerned with concepts. It brings out clearly that, not merely theoretically but in actual fact, memory is the fundamental condition of conscious experience, the most concrete fact in experience, while sensation is bare abstraction incapable of being self-subsistent experience.

In the problem of the nature of recognition two questions arise which it is advisable to treat separately. The first concerns the nature of the modification of a cognition which constitutes it a recognition. This is the problem of recognition, so far as its source is within the individual's experience. The second is the question how there can be recognition, as there appears to be, when there is no conscious memory of the prior cognition. This is the problem of recognition so far as its source is beyond the individual's experience and in his ancestral experience. The two questions together form one problem, the nature of intelligent and instinctive recognition and their relation.

In recognition there is, as distinctive of the experience, an element we may describe as againness. It is the experience "had before," "seen already." The first question concerns, therefore, the nature and genesis of the experience of againness. The second question inquires how there can be, as there certainly appears to be, recognition in the first performance by an animal of an instinctive action.

These two questions may appear to be quite distinct and to have nothing whatever in common, and some may object that while the first is a question which can only be resolved by subjective or introspective analysis and is therefore in the full sense a question of philosophy, the second is merely a question of descriptive natural history, and any theory founded on the description can only be of quite secondary philosophical importance. It must rest, they will say,

almost entirely on analogy and if treated philosophically cannot avoid the taint of anthropomorphism. I shall try to show that this is not so. The two questions are in my view very closely associated and are indeed part of one and the same metaphysical problem. At the same time I propose to keep them distinct.

There may be no pure cognition. Every cognition may be a recognition, and a pure cognition may be a limiting concept. In a developed consciousness such as ours, were there only pure cognitions and no recognitions, there would be no acquirement of meaning and therefore no experience in the ordinary sense of the word. The recognitions in present experience may be the cognitions on which future recognitions depend, and so likewise the cognitions on which present recognitions depend may themselves have been recognitions. Pure cognition, however, is theoretically conceivable, and as an abstract possibility it forms part of the concept of experience as a concrete reality. Logically and etymologically cognition is presupposed in recognition. Cognition is the ground or condition of recognition.

If the second apprehension of an identical object or of an identical event were a repetition of the first apprehension and only numerically different from it, recognition would simply be the addition of memory and judgment to the mental act of apprehension. But plainly this is not the fact, for there are cases of recognition in which there is no repetition of any experience at all, and in most cases of recognition, if not in all, even though there may seem to be a similarity between a present experience and a past experience on which a judgment of identity can be based, there is no similarity in fact. If this be disputed it is at least certain that there may be recognition where there is not even similarity between the present recognized object and any previous experience of that object whatever.

The term recognition, as distinct from the term cognition, connotes that the meaning, or content, or implication of a sense presentation is in some way already known: it is the direct immediate apprehension of familiarity with the object presented to us. The nature of this apprehension

of a mark of our own past experience in an object present to sense or to thought is the problem of recognition. How far can we directly observe the process of recognition at work—the process by which cognition acquires the modification which makes it recognition ?

Let me begin by taking some definite instances of what every one would accept as cases of recognition. This appears an easy thing because recognition is a perfectly familiar experience. It is however peculiarly difficult, and the difficulty is of a quite paradoxical nature, due to a veritable *embarras de richesse*. I can find nothing else in my cognitive experience but recognitions, and I cannot therefore establish by a clear example what is a recognition in distinction from what is only a cognition. Nevertheless for practical purposes we make a clear and well-marked distinction between what we term recognitions and the cognitions on which they depend. It is only when we analyse these cognitions that we find that they in their turn are also recognitions. When we push our analysis to the point of imagining the simplest conditions of cognition and the absolutely unanalysable character of a first cognition we are driven to hypostasize some theoretical being like Condillac's statue and endow it with sense-organs one at a time, and follow out the gradual complications of sense experience from its hypothetically simple origin. It is logic or epistemology which spurs us to the attempt, not psychology.

(1) The young chick at first pecks instinctively at all small objects. But experience very rapidly teaches it that it is pleasant to peck at some things, such as yolk of egg, or cabbage-moth caterpillars, and very unpleasant to peck at others, such as cinnabar caterpillars or bits of orange peel. The young chick profits by experience and thereby comes to recognize objects. The latter experience we should call recognition of objects in distinction from the earlier experience, and this earlier experience we should call cognition in contrast to the later experience.

(2) I arrive at a town I have not visited before and take a first stroll through its streets. All that I notice is new

to me and I set to work to find my way about. After a time or on a second stroll I am familiar with my surroundings, and I recognize what I see. The later cognitions I call recognitions, as distinguished from the earlier ones on which they depend, and which I then think of as cognitions merely.

(3) Two friends are walking in the country for the enjoyment of the exercise. Each is experiencing the same exhilaration from the crisp air, the bright sunshine and the beauty of the surroundings. One is an engineer, the other a naturalist. Their recognitions are entirely distinct. The one recognizes gradients, strains, actual or possible constructions, and the details of locomotive devices, which to his companion are merely roads, banks, valleys, hills, engines, etc. The other recognizes the character of the vegetation, the nature of the soil and subsoil, the various species of animals, which to his companion are merely green grass, hedgerows, woods, and singing birds, etc. Here then we have a practical difference between recognition and general awareness. It is only part of experience which we distinguish as recognition, and one man's recognitions are different from another's, even when the sense stimuli of each are, so far as they are external influences, identical.

(4) A favourite book of mine is Fielding's *Tom Jones*, but the enjoyment it never fails to give me is due to something literary and perhaps to something sympathetic in the author, not to an interest in the plot. Yet I distinctly remember the delightful surprise I experienced on the first reading as the plot unfolded itself. This enjoyment can never recur, and in this respect recognition, in giving me againness, leaves me poorer. It illustrates, however, and this is why I cite it, how recognition may depend upon an experience, the repetition of which the recognition itself renders impossible.

With these illustrations of the use of the term recognition, let me try and define it. Recognition is the whole content, meaning, or significance, of a sense presentation in so far as we have learnt that content, meaning, or significance, by experience. What is recognized, or what we call objectively

the recognition, is what we have learnt by experience, and learning by experience is a subjective process, by which I mean an activity of the mind. I think we always mean this by recognition. We perceive in what is present to sense what we have learnt to know is this, that, or the other, and the perception gives to the sense presentation the mark of "already seen," "had before," "againness." Against this definition it may be objected that we also use the term recognition in describing purely instinctive behaviour, behaviour which we characterize as action which is perfect at its very first performance and therefore excludes the notion of learning by experience. We say, for example, that animals recognize their prey, or recognize their kin, or recognize a menace to their life or to that of their offspring, and we apply the term even to creatures which, like most of the insects, begin their individual life without having known their parents and whose knowledge cannot possibly have been acquired by individual experience at all. Undoubtedly the use of the term recognition in cases of pure instinct is derived from its use in cases of rational knowledge, and many no doubt will deny that there is any identity of fact underlying the use of the term in the case of instinct. I think it is a right term to use, although primarily it only means that the creature acts as one acts who has learnt by experience and therefore already knows. The difference between instinctive recognition and intelligent recognition is that the mark of the past in instinctive experience cannot be explained by individual but only by racial experience; it is innate or congenital. Recognition always implies that there has been past experience and that the individual has learnt by it, though the past experience is not in cases of instinct the individual's individual experience.

A more fundamental objection, however, will be raised. To explain recognition as learning by experience is to explain what is difficult to understand by something more difficult to understand. Even if it be granted that recognition always depends on our having learnt by experience, this will bring no solution of the problem. It simply overwhelms the difficulty of accounting for a modification of a

present datum of experience by a mark of past experience with the far greater difficulty of conceiving a process by which the past can modify the present. I admit this difficulty, and the main purpose of the present study is to make it explicit. Recognition implies that we learn by experience, and learning by experience implies mental process modifying the data of knowledge. It implies also that there are no unmodified data as ultimate constituents of the reality we know, for if there were they would be unrecognizable.

Many philosophers will also, I know, reject my order of implication *ab initio*. Learning by experience, they will say, implies recognition, and wholly depends upon it, whereas recognition does not imply learning by experience, for it is theoretically possible in minds whose knowledge is purely contemplative. Indeed, such must necessarily be the order of implication for those who hold that knowledge is essentially contemplation. Recognition will be for them a perception or a judgment of a relation between two terms—one a present sense-datum, the other a memory.

Recognition is immediate experience. The process which has made it recognition is already past, and not to come. The sense-datum, if we use that term to denote the actual object present to the mind, has not to wait for the judgment or perception of a relation, in order that it may become, what as yet it is not, recognition. Take then any one of my four cases and attempt to reduce it to the perception or judgment of likeness between a present sense-datum and remembered sense-data, and you will soon discover the failure is absolute. Not only is there no identity (this is obvious—we might, perhaps, posit an identity of unperceived substances, if that would help us at all, but there can be no identity of sense-data), there is not even similarity. Take the chick which first pecks the cinnabar caterpillar, then afterwards rejects it, while it continues to peck the cabbage caterpillar. The sense-data are entirely different the second time, for the chick has learnt to distinguish the objects, which as physical objects are unaltered ; that is to say, the resemblance between the caterpillars, so far as the

resemblance is objective, has not disappeared on the second occasion. The important thing is, that whatever the chick knows about the caterpillar when, meeting it a second time, it rejects it, is something it has learnt the first time. If it has learnt nothing the first time it will learn nothing by repetition. Only if it has learnt something the first time will it modify its action the second time. I have chosen this particular illustration for its simplicity, as an instance of intelligent, not of instinctive recognition. No one supposes that logical processes take place in the mind of the newly hatched chick. It is possible they do, but it is a possibility most people would ignore. Now we may suppose that recognition is the condition of learning by experience, or we may suppose that it is the conditionate. If it be the condition, we must suppose that there is a mental process, involving a memory-image, an act of comparison and a judgment or perception of a relation, as well as the present perceptual matter. It seems to me highly improbable; but even if I suppose there is, learning by experience does not necessarily follow; whereas, if I suppose the animal learns by experience, recognition is a necessary consequence. Take the other illustrations. Unless I am learning by experience in my first stroll in the strange town, my second stroll will be equally strange, there will be no recognition. The sense-data will yield nothing on which a judgment of identity can be based, for they are not the same nor similar. So with the third and fourth illustrations, the recognition is not the observation of a relation of likeness between sense-data, I shall search for ever and in vain for any likeness. Recognition is due to a progressive work of the mind exercised at and from the beginning of experience, and continually throughout experience. It is not an external act of comparison of the experience of one moment with that of another and earlier moment, possibly only at the later moment, and dependent simply on the power of the mind to retain and revive a memory-image of the earlier moment. I recognize in the later moment only what I have *learnt* in the first moment, but to be able to recognize I must have been learning by experience. Learning by experience is

not something which happens only on the repetition of a particular experience, it is a primary process taking place on the first occasion.

Learning by experience presupposes a distinction between the mind and its objects. The expression itself implies that there is something obstinately objective in the reality opposed to thought, stubborn fact which the mind may turn to practical advantage by understanding it and adapting conduct to it. It also supposes that what is past can still, though past, modify present action. This seems to be effected by the blending of memory with sensation in perception. Learning by experience, further, positively excludes the notion of pure repetition. Every fresh instance comes before the mind modified by previous experience.

The problem as it affects theory of knowledge may be presented then as an inquiry into the *a priori* conditions of recognition. What are the conditions of an experience in which there is no repetition, but a continual modification of the present by the past? What is the meaning in such an experience of "againness"? What mental factors are necessarily supposed and how do they bring about the result? And what do they imply as to the ultimate nature of mind and reality? The factors seem to me to be these: (1) Retention. (2) Revival. (3) Discrimination. (4) Selection. (5) Habit-memory. (6) Pure Memory or Recollection.

I will briefly indicate what I mean by each:

(1) Retention is presence together in consciousness of what is before with what is after in experience. It is the holding together in a present duration-span of an experience itself successive.

This duration-span of consciousness I have already described as the moment of experience. The retention implied in that phrase is the essential character of the mind which makes connected experience or consciousness of duration possible. Without it experience is inconceivable. Were there no retention in this primary meaning, sense impressions, did they exist, would be fleeting and perishing as the stimuli which occasion them.

Retention appears to me the most direct and the most

obvious instance of the reality we name mind and the clearest manifestation of its essential character.

(2) Revival is the recall of an experience after it has ceased to be retained in present consciousness. It also is named retention, because it implies that experience which has passed out of consciousness is still retained. It is different, however, from what I have called retention, for the revived experience comes to consciousness without the peculiar character of being present to sense and with the ghostly character of a memory-image. It is revival which makes the past appear to us a continuous objective reality, to any part of which we can turn our attention, in the same way as that in which we turn our attention to any part of the objective reality we call spatial.

(3) By discrimination I mean that experience can be dissociated or disintegrated on any principle and the elements so dissociated can be associated and redintegrated in any order and on any principle. I include under discrimination both disintegration and redintegration, for they seem to me to form one mental activity. Each of our individual minds seems distinguished from every other mind, not by its objective experience, but by its own special centre of interest and the standpoint from which it orders and arranges its experience.

(4) By selection I mean the suppression or the exclusion from consciousness, or the neglect by consciousness, of some aspects of experience, or of some influences, which if admitted would modify experience, or of some data which, if attended to and not neglected, would tend to make experience an undifferentiated whole instead of a discrete reality. The discreteness of the objective world of our knowledge is due to the mental work of selection. The selection is exercised automatically in the first instance by the sense-organs, and by many of the neural mechanisms of the brain, but also directly by the mind itself.

(5) Habit-memory fixes past experience by setting up motor dispositions in the brain. It is a memory which repeats or re-acts the past as distinguished from a memory which surveys it.

(6) Pure memory, or recollection, is the past preserved as a record. It enables us to date our experience. It is more than schematization in a time order and space order. It apprehends an absolute or integral time order, every part of which is in an indissoluble relation of time and circumstance with every other part.

These seem to me the essential factors of recognition. They are not hypothetical, but the essential facts in our experience which enable us to form concepts of mind and of the modes of its activity. I do not conceive the factors I have distinguished as separate activities assembled in the mind or in the organism, or as separate characters or attributes of the mind sometimes present in, sometimes absent from, its activity. And I do not conceive mind as a general term, or class-name, to denote these specific activities, for they imply a real substance and a real life. All the activities I have distinguished, but especially the last, pure memory or recollection, imply that the past is recorded, that a register of it exists. Recollection is inconceivable as a fact and must be pure illusion unless there exists a register of the past. The register seems to be integral and independent of actual recollection. I do not propose to enter on a full exposition of this theory. There can be no doubt, I think, that there exists a register, for a fact such as recollection is conditioned by it; the only question can be whether this register is in the mind or the brain. In my view this register or record is the substance of mind. I use the term substance only in order to distinguish between mental stuff and mental life. Memory is this stuff, but mind is not mere receptivity, a growing record of external material, it is an active process.

The life of the mind is a continuous organization of experience. The mind is not passive, waiting on experience and passing judgment on it reflectively as it flows past. The mind advances to meet experience, its attitude is not contemplative but expectant. It is forward-looking, ready prepared, ready organized to receive the external influences reaction to which is the primal necessity of life. This attitude has been named attention to life. It characterizes

mind wherever in the animal world we meet it. It determines in advance the form the coming experience will assume. Nothing is less like the mind than the old-time image of the wax tablet on which the objects of the external world make imprints. The mind, as I conceive it, is an active power of organizing experience, and lives by assimilating the experience it organizes.

A good illustration of this work of the mind is afforded us by the physiology of the organism. The digestive organs, the stomach and intestines in particular, were, before the days of scientific physiology, regarded as more or less mechanical receptacles for food, supplied with the necessary acids and ferments for reducing it, and fitted with a kind of filter apparatus for letting the nutriment pass into the blood stream, and all these contrivances had nothing else to do but passively wait for supplies which, when they came, were mechanically and automatically reduced and utilized. Modern physiology gives us an entirely different notion of the vital activities at work in the digestive process. A vast system of co-ordinated activities, each with its distinct function, is ready prepared to receive and deal with the food. The supply of the food is not in its control, neither the quantity nor the quality, but though dependent on external supply, the result of the process is not determined by the external supply. It is regulated and delicately adjusted by the pre-adaptation of the digestive processes themselves, which exercise selection and discrimination. The result is the maintenance of the living body in a state of efficiency and equilibrium as one organic unity. The mind appears to me as a spiritual organism, which maintains itself in the same way. Experience is, as it were, fed to it, but the mind is not a passive receptor. It does not contemplate the reality which flows past it, it incorporates it. It meets experience with a ready-prepared organization to deal with it. Its various activities are those I have named — retention, memory, selection and the rest. The result is the maintenance of an individual soul, the unity of a personal character.

Let me now return to the direct problem of recognition.

This problem is to account for the occurrence of againness in experience even though nothing is repeated,—to account for the feeling of "seen before," "this again," "had already," directly attached to the object of cognition. This feeling requires explaining, because, in fact, there is no repetition, and can be no repetition, for experience is a continuous change.

What happens, then, when a totally new sense-presentation arises? How can it have, in addition to its own apport, the perception or judgment which refers it to the past and declares it to be "this again"? It sounds a paradox. My theory of the mind gives me the explanation. Recognition is the form which prior cognition gives to new experience. The mind receives the new presentation into a ready prepared organization of past knowledge and incorporates it. Recognition is the expectancy with which the mind grasps the novel, the unknown, the unforeseen. By this I mean not only that recognition has prospective value—the whole attitude of life is forward-looking and all value seems to be prospective. I mean more than this. The past, as from being present it becomes past, gives form and substance to the present activity and is carried along in it. It is this incorporation of past experience in present activity, and not repetition, and also not resemblance of present experience to past experience, which constitutes recognition. And this explains why and in what way all cognition is of necessity recognition. The life of the mind, the mental process, consists in, and is sustained by, the continual reception of the yet unknown into the frame or organization of the already known. We modify reality by impressing on it a mark of the past in the present act by which we grasp it, and with every new addition there goes a correspondent modification of the frame or organization which is the mind. Thus it is that all new experience comes to us bearing as it were already on it the mark of the past. The mind stamps reality with this mark in the very act of apprehension, not because the mind receives the manifold of sense into stereotyped frames or categories, as Kant

supposed, for the frames also are being subtly and continuously modified by the mutual adaptation of the mind to its experience and of experience to the mind. There is no absolute repetition of anything, either of mental act or of physical object, there is continual new invention. This, then, in my view is the modification of experience which makes all cognition recognition.

This process, with the various activities I have distinguished in it (not presented as exhausting it but as characterizing it), is the *a priori* condition of the possibility of recognition. It is not a condition of recognition that a memory-image, general or particular, should be present to the mind, challenging comparison with, or provoking a judgment on, the sense-datum.

Let us now turn to the second part of the problem. So far we have been considering rational or intelligent recognition only, and not instinctive recognition, or rather we have been considering only the recognition which appears to be explicable by the experience of the individual. If my theory be true, recognition is an effect of the continuity of mental process. Nothing in the phenomena of ordinary recognition suggests that the explanation is in bodily structure rather than in mental activity. We have, in fact, no need to raise the question of the relation of mind and body, because, whatever be the nature of this relation, recognition is concerned only with mental facts. But when we come to study instinctive recognition, there seems to be no mental continuity such as we conceive necessary to constitute an individual mind, and we seem to be left with one kind of continuity only—the material continuity which links, by the living protoplasm in the germ, one generation of conscious individuals with another. It will not be disputed that instinctive behaviour, however we account for it, presents the appearance of recognition as one of its essential traits. An instinctive act is the act of one who already knows and is therefore familiar with the conditions and circumstances under which it is acting. This is true, even of the first performance of an instinctive action, and whether or not repeated instinctive performances show any advance

on, or essential difference from, the first performance, the familiarity with the conditions we are describing as recognition is not dependent upon repetition. In intelligent behaviour there is no repetition, but in instinctive behaviour there is practically perfect repetition, or rather a specific character of invariability in the repetitions, but this repetition in instinctive actions marks something negative so far as mentality is concerned. It implies that there is no learning by experience. If, then, one peculiar mark of instinctive behaviour is invariability in repetition, and, consequently, an absence of " learning," must not recognition as a description of such behaviour be unmeaning ? We seem to be driven for an explanation of instinctive knowledge to the bodily organization rather than to the mental organization. Instinct suggests something structural in the nervous system. Now clearly, as it seems to me, if it should prove possible to explain instinctive knowledge as a phenomenon of physiological process without mind, there would be a strong presumption that intelligent knowledge could also be explicable in the same way. So that the whole problem of the nature of knowledge may be said to depend on the problem of the genesis of instinct, and it is important therefore to show why we cannot explain instinctive knowledge without supposing the continuous activity of mind independently of physiological process. I will try to give reasons for this view.

An example of instinctive behaviour is hardly required for the purpose of my argument, but it may be useful to refer to a definite case. I cannot do better than take Professor Lloyd Morgan's classical experiment with the incubated moorhen. I need not go into the details. The little creature, after many failures of the experimenter to induce the characteristic diving action, performed it at once in response to the stimulus, absolutely novel in its individual experience, of a romping puppy. In this behaviour every one will, I suppose, admit that there was conscious awareness, though many will deny that there was anything whatever in it which can rightly be called recognition. Yet the familiarity with surroundings, the

evident feeling at home in the environment, the absence of strangeness and embarrassment which was exhibited in its action, is, so far as its nature is concerned, indistinguishable from what I call recognition in my own experience. It is immediate knowledge, but so in my view is intelligent recognition. If then there be no difference of nature between intelligent and instinctive recognition, is the difference in the genesis ? Is the view I have put forward of the genesis of intelligent recognition inapplicable to instinctive recognition ? We know that the creature's ancestors have behaved in this characteristic way throughout a long series of past generations, and that the immediacy of the response is due to a congenital disposition to act in this way. But the individual moorhen does not know this, unless we suppose that its memory goes back to those previous performances of its ancestors and that it has, as part of its congenital disposition, the power to revive memory-images of them. This seems improbable to such a high degree that we may as well reject it outright.

Here then we have a creature manifesting all the signs of mentality and of mentality in a highly developed form. It acts as if it remembered what it is impossible that it can remember, for there is no continuity of consciousness between its action and the source of that action in past experience. The only unity and continuity manifest to us is the physiological process which has carried it from the fertilized germ through the stage of unconscious life in the egg to separate individual activity. Does the creature's mind somehow bridge this gulf which separates its individual brain from the brains of its progenitors ? Before we can answer this question we must form some concept of the creature's mind and its relation to the creature's body.

It is unnecessary in this connexion to review the theories of the relation of mind and body, whether it is a relation of interaction or of parallelism. There is an aspect of the terms and of their relation which presents itself to every one independently of any theory. There is a certain unity of life which characterizes the complex and infinite variety of physiological processes which constitute

the individual organism. Let us understand that this is meant when we refer to the body. There is also a certain unity of conscious processes which makes awareness of every kind part of a personal experience. Let us understand that this unity of conscious personal experience is meant by the mind. This is what we ordinarily mean when we contrast body and mind, that is to say, we mean the living body, not the dead material body, and the thinking mind. It is different from the contrast between body and mind when what is meant by body is a certain disposition of molecules or atoms or electrons. The distinction is rather between life and mind, between living process and conscious process. This distinction of mind and body is, I think, practically the same as that of Descartes. The mind thinks, the body lives. The body, being an extension, is automatic and mechanical and determined; the mind, being inextended, is independent of the body which it guides and controls, and is free in the sense that it is without and not within the series of mechanical actions and reactions which modern physics have formulated in the principle of the conservation of energy. I do not mean that body and mind are two substances as Descartes held, but that from the standpoint of a living creature endowed with conscious awareness, living body and thinking mind are, as Descartes conceived them, two completely distinct realities, each with a quality which excludes the other, each a unity and individual. From this point of view, namely, that of a distinction between living and thinking, it is possible to regard the living body as a self-regulated automaton distinct from the thinking mind or the soul, a view which Descartes held, and which seems to accord with many recent physiological discoveries. Let me try and illustrate what I may call the mutual convergence and divergence of these two individual systematizations, living body and thinking mind.

The first part of the digestive process is the mastication of the food; it is followed by deglutition, then by the many varied processes which are carried out by stomach and bowels. The divisions between these various stages or processes of digestion are merely convenient,—all form part of

one complex but co-ordinated systematic process. Parts only of this process are accompanied by consciousness or awareness, in the form of sentience. Mastication is accompanied by the special forms of sentience, taste and smell; and all the muscular actions of the tongue and palate and the closing of the glottis during deglutition are also accompanied by awareness; but from that stage in the digestive process sentience ceases, and most, nearly all, of the succeeding stages, peristaltic action and the like, are devoid of sentient accompaniment altogether. Now we may say that sentience where it occurs in mastication and deglutition is useful to the creature, it serves the purpose of incentive to obtain food and of discrimination in the food procured, and equally we may say that insentience where sentience does not occur is useful. So far, however, as the efficiency of the process is concerned, there seems to be no need for its existence whatever. It may serve a purpose, but the purpose is no part of the actual process which it accompanies. Yet though from the point of view of the digestive process the sentient accompaniment is fragmentary and sporadic, sentience itself is not fragmentary and sporadic, it is one and continuous with the conscious awareness exercised by the unity we call a man's mind or soul. So when we describe a man's taste as refined, or cultivated, or debased, using the word taste in its original meaning to indicate his pleasure in what he eats, the fact, so far as the man's body is in question, concerns only a small part of a complex physiological process, which process is indifferent to it; so far as the man's mind is in question it concerns the whole of that unity we call personal, it is continuous with a man's character. From the physiologist's point of view therefore sentience is an epiphenomenon accompanying a certain specific living process, and exercising no efficiency; from the psychologist's point of view sentience is an inseparable element of another and altogether different order of reality and kind of unity. These two continuous processes meet for a brief moment in the functioning of a taste bulb The true image of them is that of two spheres which when they meet touch only at a point common to both, but

which by moving on one another have a series of points successively common.

These two self-centred unities, thinking mind and living body, if from our individual standpoint they appear as two complete systems, are from another standpoint not self-centred, but each continuous with a larger system of reality. We know that we directly continue in our body the life of countless generations of ancestors, and that we shall hand on this heritage to succeeding generations. We also know, though it is not so easy to envisage, that our mind is not formed within our individual lifetime and anew for each individual. It is continuous with the experience of past generations and has been formed out of it. Each individual living centre bears along in the focus of its activity the impulsion as well as the construction of an illimitable past. Now, although we suppose that this past was always like the present, that each individual of a former generation united in his action, as we do, a thinking mind and living body, yet when we think of these two systems transcending the individual life, it seems to us impossible that the original source is twofold. What makes the original impulsion seem single is that mind and body appear to have evolved *pari passu*, every increase in mental range being co-ordinated with a complexity of brain structure, while what makes the dualism in the individual seem pronounced is the complete disparity between the two orders. From the standpoint of evolution we are naturally, I think, attracted to Spinoza's idea of mind and body as two modes of one substance. Whether with Spinoza we name this substance God, or with Bergson *élan vital*, we have to recognize that, though the source may be single, the manifestation is always twofold—the living body and the thinking mind.

This brings us at once to the main problem—how is this twofold continuity carried over from one generation to the next? Let me first notice one question, which may for many people have a decisive bearing on the solution. Is the difference between the individual mind of an animal whose behaviour is predominantly instinctive, and the mind of a man whose behaviour is predominantly intelligent, a

quantitative difference only, or is it a qualitative difference also? It seems to me, relying wholly on analogy, direct proof being obviously impossible, that the mind of the lower animal is in every respect like the human mind, differing only in its range. There seems to me every reason to suppose that the moorhen's mind differs from mine in the ratio that its brain differs in complexity from mine. Its brain registers, so to speak, its range of action, as my brain registers mine, and it is not likely, again judging by analogy, that its mind is inadequate or more than adequate, to its range of action. If this be so, then the mind of the lower animal is, like mine, a continuity of personal experience, and must stand to the continuity of physiological process, the living body, in the relation I have schematized by imagining two spheres in contact. There is in that case no difference in kind between human behaviour and that of the lower animals, there is only a difference, which may be very deceptive, in the proportion of their behaviour which we describe as instinctive and that which we describe as intelligent.

But is it necessary to suppose that an animal has a mind? Can we not class instinctive actions under vital actions? We associate with mind the creation of aesthetic, logical and ethical values, and we find it very difficult to suppose that there is anything even corresponding to these in the mind of the animal. Yet it seems to me that in instinctive action, though these be absent, there are mental elements which are not merely vital. These are (*a*) sentient enjoyment, or simply sentience, indicating conscious awareness of action in progress; (*b*) familiarity, indicated by the absence of strangeness in the behaviour (this is what I call recognition); and (*c*) pre-awareness, a certain readiness of attention or alertness, indicated by a forward-looking attitude towards the action. All of these, if they are present, and to the extent to which they are present, are mental characters in the full sense of the term mental, and it seems to me further that the animal mind must depend as ours does on imagery. What this seems to imply is that all these characters are

continuous with, and derive meaning from, the fact that they enter as constituent elements into a mental organization, the unity of an experience.

It is a twofold continuity, then, which has to be carried from one generation to the next. The link which joins the generations is neither living body nor thinking mind, neither brain nor soul, but a germ. The germ neither acts nor thinks, at least not in any ordinary meaning of those terms ; it undergoes development, and it holds within it the potentiality of developing a living body and a thinking mind. We are led, therefore, it seems to me by logical necessity to the concept of life—not life the mere abstract idea of an attribute common to processes we class as living, but life the concrete idea of a reality of which living body and thinking mind, organic activity and personality, are modes.

The thesis, then, which I have endeavoured to establish is that recognition is knowing what we know already. It is the mark of our past experience which a present and entirely novel sense-presentation bears, and this mark is immediately apprehended as part of the presentation, and is not inferred from it. It implies prior cognition but it does not imply that a memory-image of the prior cognition is present in consciousness together with the recognition ; and *a fortiori* it does not imply a mental process of comparison with a prior cognition or the perception or judgment of a relation of similarity. It is the resultant of learning by experience ; the conditionate, not the condition. It is not by recognizing that we learn by experience, but having learnt by experience we recognize. Learning by experience is not dependent on repetition, and in experience there is, in fact, no repetition. Learning is the mental process by which the mind incorporates and assimilates experience. It is an activity which begins with, and continues throughout, experience. Recognition may be intelligent or instinctive. Both are of the same nature. Each is the immediate apprehension of entirely novel sense-presentations with the mark of prior cognition. In intelligent recognition we can by reflexion bring to the mind the factors of the process, and

so, in a manner and within a limited range, reconstitute the process. We can bring to mind memory-images of the prior cognition so far as the prior cognition falls within the memory range of the individual experience. This gives rise to the illusion that recognition is dependent on this reflective thought. We think we recognize after reflecting, whereas in reality we reflect after recognizing. In instinctive recognition, on the other hand, we cannot reconstitute by reflexion the prior cognition, because it does not fall within the individual's experience. It lies in the ancestral experience.

The problem of recognition is the same for intelligent as for instinctive recognition—how can new sense-presentation be known as what is already known? The solution suggested rests on a distinction between life and mind, or living body and thinking mind, and a comparison between the activity of each. They are distinct self-centred organic continuities; sentient experience enters each system, but the systems are tangential to one another. The mind is an organization of experience. All past experience has not only contributed to it but is incorporated within it, giving it character and individuality. New sentient experience can only enter by receiving the mould or mark of this organization. This constitutes recognition. Instinctive recognition raises a larger problem. How is mental continuity established and maintained between one generation and another, since generations are separated by a state in which there is neither living body nor thinking mind? The living germ has neither brain nor soul, but is the potentiality of the development of both. The solution suggested is the concept of life, not an abstraction from living process, but a pure, universal, concrete concept.

CHAPTER VIII

THE DIVERSITY IN UNITY OF BODY AND MIND

Propterea ad determinandum quid mens humana reliquis intersit, quidque reliquis praestet, necesse nobis est ejus objecti, hoc est, corporis humani naturam cognoscere.—SPINOZA.

IN conscious experience I am aware of two realities which in a sense are antithetical to one another, in a sense also are complementary to one another, and each of these realities in its full extension comprehends the other. I am aware of nature and of life. I recognize this twofold reality at every moment which I call "now." The recognition takes the form of an affirmation, an "I am" which admits of no negation. There is no intelligible form and no means of expression by which I can affirm the proposition "I am not." Certainly I can conceive my non-existence. I do so, however, simply by suppressing in thought one of the antithetical realities in my conscious experience, and then conceiving the other self-subsistent. In imagination I can suppress life altogether and find no difficulty in presenting nature unaffected by its absence. When I make explicit the full implication of this twofold existence, which I affirm in every moment of experience, it seems to involve: (1) Space or extension; (2) Time or duration; (3) Definite objects and actual events; (4) Myself, here and now, actually and actively participating, contemplating objects and controlling events.

It seems to me, however, that I participate in a purely external way and that my activity though affecting the disposition of external reality is without any relation to its existence. On the other hand, an external and independent

reality seems absolutely to condition my activity so that if in thought I suppress this external reality there is nothing on which it can take hold and its self-subsistence is practically if not theoretically inconceivable.

Nature accordingly appears to me to be self-subsistent in a way that life is not. It is this one-sidedness of the antithesis, this emphasis on, or bias towards, the reality characterized by opposition to life, which unfits science to comprehend life itself. It could only comprehend life by including it within the objective system of nature, and this is impossible because the objective system is never without its relation to the subjective system. The known can never detach itself completely from the living subject for which it exists, and physical reality is never pure reality completely independent of psychical conditions. Science is always haunted by the spectre of a reality which it cannot comprehend because it is for this reality that it exists. At the same time that we recognize the impossibility of comprehending knowing itself in the ordered and orderly system of the known, we feel that the ideal of our science is balked by this very disability. Physical science while drawn irresistibly toward the objective aspect of reality is for ever finding itself vainly trying to include an elusive reality without which it is truncated and incomplete. This is where philosophy diverges from science. It is this elusive consciousness or life which philosophy seeks to systematize, not by bringing it under an objective order to which it is not amenable, but by taking it in its first intention as a comprehensive activity from which the subject-matter of the sciences is derived by abstraction or by schematization. The great difficulty of the task is that we have to work against the strong current which draws our mind away from attention to itself and its own activity towards the action which is the object of that activity. It is a most significant fact that whenever philosophy yields to this attractive force, when it adopts scientific method, it tends inevitably to take up a negative attitude towards the psychical reality which has called for its exercise and subordinates consciousness to an aspect or adventitious quality of physical reality.

The strong and ineradicable tendency in science to treat objective nature as fundamental and self-subsistent, and to reduce psychical nature to a dependent, conditioned, shadow-phenomenon, is in complete accord and perfect harmony with our nature. We feel that in science and in scientific method we are simply letting our mind follow the natural disposition and direction of its activity. In philosophy, on the other hand, we feel that we are struggling against the stream, striving to reverse the natural inclination of the mind. We have only to pause for a moment in our task, whatever it be, to be conscious how completely dominated we are by the overwhelming sense of the objective reality of the physical world of ordinary experience. We know that science completely transforms its aspect, presenting to us as apparent and evanescent what we had at first taken to be solid and substantial, replacing definite sensible objects with insensible atoms and molecules, not even letting us rest in these intelligible objects but resolving them into electrical charges, and yet however far we travel along the scientific road we are never allowed to lose our grasp of a definite objective reality. Philosophy raises strange doubts which even the plain man cannot wholly exclude, and if we follow its lead it seems to undermine our whole common-sense notion of reality until in the end all that we have ordinarily regarded as certain or self-evident is left without support and what was sure science is replaced with total theoretical scepticism. Yet nature is too strong for us, practically we are helpless. "Nature," says Hume, "by an absolute and uncontrollable necessity, has determined us to judge as well as to breathe and feel; nor can we any more forbear viewing certain objects in a stronger and fuller light, upon account of their customary connexion with a present impression, than we can hinder ourselves from thinking, as long as we are awake, or seeing the surrounding bodies, when we turn our eyes towards them in broad sunshine."

It is incumbent on us, therefore, as a first task in philosophy to understand what this bias towards the reality of the object denotes. Science is practical. It does not

interpret reality, it describes, classifies and systematizes it. It seeks uniformities, it makes abstractions, it analyses. It regards sameness and identity, it disregards difference. It replaces the richness and infinite variety of the real with an abstract and simple order. In this process of discovering order and uniformity in experience it is not only rendering service to human activity, it is doing far more than that, it is actually developing human activity along lines naturally marked out for it by the human intellect itself. The failure of science to interpret life is not a defect of science, and the task of philosophy is not to take up the work of science at the point which for the moment marks the limit of its achievement. Science is practical activity on the lines which the intellect itself has marked out, while philosophy is the comprehensive grasp of intellect in its relation to life. This "absolute and uncontrollable necessity" is the significant fact for philosophy. It reveals to us, not that the bias in our nature is due to an illusion or that it is a falsification of reality, but that the truth we discover in scientific inquiry is relative to our needs and determined by the range and mode of our activity.

There is yet a question to ask. How comes it that physical science, even if we allow that it can never complete itself, cannot satisfy us with its concept of reality? Is it merely embarrassed because this elusive shadow-thing we call life or consciousness escapes it? Clearly we have to look deeper for the cause of dissatisfaction. This deep-seated cause is that science has no principle by which it can account for the uniformity it discovers everywhere in nature. This uniformity of nature is for science an axiom and postulate. Nature does not reveal the ground of it in confirming the fact of it, and science has to accept or rather assume it. Science itself therefore, in the very principle on which it rests, sets a problem for philosophy. It is a problem of philosophy because no extension of scientific knowledge could attain its solution. Science depends on our regarding nature as a system and as one system. Yet the mere concept of external, independent, self-subsistent reality does not carry the necessity of order, or system, or unity. On the

contrary, it makes order extremely improbable if not absolutely inconceivable. Chaos is not inconceivable, nor even irrational, but the concept of nature as chaos is the concept of nature as impossible science. Manifoldness is the essential character of nature. Every part of the material universe is external to every other part and there is no limit to its divisibility. Uniformity or unity of this manifold is not essential to the concept of a material universe. If uniformity of nature be a necessary assumption of physical science it is not because it can be deduced from the concept of external reality. On the other hand, the essential character of life is indivisibility. The manifoldness which characterizes living forms and individual minds is not a manifoldness of life or of mind but of physical nature. The individuality of life or mind is not dependent on spatial division or limitations, and its continuity or indivisibility is primarily the character which marks it as spiritual or psychical in distinction to material or physical. Consequently we seem to know two kinds of reality, each in the abstract distinguished by characters which are the direct contrary of the other,—an abstract physical reality, distinguished by manifoldness, discreteness, divisibility, separability; and an abstract psychical reality, distinguished by indivisibility, concreteness, comprehensibility. Reduced, therefore, to its most abstract form the problem of philosophy is the problem of the one and the many. If we approach it from the side of physical reality it is how are the many one? We accept, that is to say, the essential manifoldness and inquire into the nature of the uniformity it exhibits. If we approach it from the side of psychical reality, life or mind, the problem is how the one is many. We accept, that is to say, the unity of consciousness and search for the principle of diversity.

There seem to be only two alternatives. They are directly contrary so that the truth of one must imply the falsity of the other and there is no *via media*. The alternatives are that either the uniformity of nature is a character inherent in the manifold and we discover it because it is there to be discovered and discoverable, or the uniformity is the work of the mind, a condition of knowing and not a

character of the existence known. The manifold according to the second alternative is the real existence, in itself it is without order or system, but it is capable of entering into order or system and this is what happens to it when the mind apprehends it ; order, that is to say, is imposed by the mind in the act itself of apprehending. Let us follow out, then, the two alternatives.

According to the first alternative the uniformity of nature is in nature as an existence. In this case we must suppose the mind to be in presence of a mystery in its very nature inexplicable, which must ever remain a mystery, how far so ever knowledge extend, because no principle can give us the clue. We are and we feel ourselves to be in the presence of facts, we may amuse ourselves in framing hypotheses of origin, we may have and we have a physical science for there is no limit to discovery or description, but though our science is secure we cannot have a philosophy. If we are wise we shall take as our motto *Hypotheses non fingo* and content ourselves with describing, in the most objective form we can command, the facts, which we shall accept at their face value without questioning their conformability to laws of thought. When fact is irreconcilable with reason we can find comfort if not satisfaction in the truth that " there are more things in heaven and earth than are dreamt of in our philosophy." We may still have scientific research, and it may meet with no small measure of success, but if we push inquiry or challenge the criterion we cannot stop short of total scepticism. Naturalism as a philosophy rests on agnosticism. Such is the first alternative.

If we turn from this to the second alternative, we get a philosophy of nature, but apparently only by sacrificing or at least by undermining the foundation of physical science. We begin, it is true, by recognizing a manifold upon which the mind imposes order and which it moulds in frames to present a systematic unity, but this manifold soon proves useless to assure the objectivity which physical science demands. The laws of nature all fall within the subjective aspect of knowing. The *a priori* conditions of knowledge

are in the knowing mind, not in the matter known. This matter which began by being the reality itself, in and for which, and to apprehend which, knowledge came into existence, tends more and more to become useless, then meaningless, till finally as the empty or idle concept of the unknowable thing-in-itself it fades out of the picture altogether, or remains in the unsubstantial form of a concept of limit. Such is the second alternative.

Are these our only alternatives? Yes, so long as we accept the concept of reality on which the opposite theories are based there is no way of escape from the dilemma to which they lead us. Once committed to the concept of a reality distinct from life and knowledge,—a reality which conditions life and on which the activity of life depends, a reality which is a merely objective existence contemplated by a knowing mind,—once committed to this and philosophy has only the two alternative directions. One is realism, the other is idealism. If both turn out to be blind-alley paths of speculation then the concept on which they are based stands self-condemned and progress depends on reforming the concept of reality.

Such a reformation is not an undertaking to be entered on by arbitrary critical analysis. Our concept of reality is not under our control, it is not a notion we have framed capriciously or acquired by any kind of reasoning from experience. It is the expression in thought of what is rooted in fact. There is only one possible condition on which we can reform our concept of reality and that is that we should be able to discover something in human nature itself which determines our concept. Such a discovery would in itself bring to view a more fundamental concept. We should find the ground for a new start in a new concept. And philosophy itself demands of us this new task. It is not enough to see that realism and idealism must end in scepticism, for scepticism is not an end but a warning-notice showing that we have taken a false route.

The theory of monads is based on a different concept of reality from that which leads to realism and idealism. It is not a theory which corrects some false step in the

realist or idealist argument. It is an alternative theory but only in the meaning that it replaces the concept of reality from which they start with a concept in regard to which both are meaningless. But their concept was not arbitrary, it was rooted in the fact of existence. The new concept must in the same way rest on fact of existence as distinct from reasoning. It must not present itself as a matter of choice. In fact, the discovery that the old concept is irrational at once and necessarily brings to view the new concept. Descartes's new concept came to light in the discovery that the senses are not primarily intended to instruct us in truth but to protect the organism from destructive injury, so our new concept comes to view with the discovery that our intellect is not primarily insight into reality but a mode of conscious activity evolved for the service of life. Before I try to point out more clearly what in actual experience has led to the formation of the false concept and indicate wherein we get the clue to the new concept, I will illustrate the general principle by reference to an instructive analogy in the history of philosophy.

The more I study the philosophy of the seventeenth century the more striking appears to me the analogy between their problem and ours to-day. I have continually illustrated this in regard to the nature and origin of the problem of philosophy, I want now to show that the analogy is also very remarkable in regard to the development. When the Cartesian philosophy had run its course a similar dilemma occurred to that which we find to-day in regard to the theories of realism and idealism. Descartes had started with the concept of two substances, thought and extension, and this concept seemed the natural and necessary basis of the realities of experience, mind and matter, and the ground of knowledge and existence. It produced the principle of clear and distinct ideas and it led to one of the most concentrated and definite efforts of philosophical construction in the whole history of human thought. It failed, however, and the failure became more marked as it developed, to solve the initial problem how and why the idea represents the reality. The movement ended in the

monistic theory of Spinoza. Without questioning the dualistic concept of reality which gave to the whole movement its problem Spinoza maintained the unity of substance. His problem, therefore, though resting on the same concept became the direct antithesis of that of Descartes. The one starting with dualism strove to explain the unity implied in knowledge, the other taking unity as a necessary presupposition strove to explain the diversity which exists in fact. Mind and matter, Spinoza held, are parallel modes in which two infinite attributes of a universal substance manifest themselves. Here, then, was a dilemma from which there seemed no escape, from which indeed there was no escape. Accept the concept of reality as twofold,—that there are two independent substances, or two mutually exclusive attributes of one substance, and that these two substances or attributes are in a relation which brings it about that one represents the other and that other is representable to it,—and there are two alternatives. Either the duality is fundamental existence, how then explain unity? Or the unity is fundamental existence, how then explain diversity? Leibniz saw that there was no issue from this dilemma and it indicated to him falsity in the underlying concept. He reformed the concept of reality by a new definition of substance. He rejected the static principle which the old concept implied and replaced it with a dynamic principle. A simple substance is a monad, a subject of experience, an active centre into which a universe is mirrored, whose activity consists in perception and appetition. From this reformed concept a whole new advance was possible. The point I wish to call attention to, however, is not the new concept itself but rather the fact in experience which had furnished the clue. This was the mind-body relation. Descartes and Spinoza had concentrated attention on this problem. Each had sought to interpret it by studying the two existences in their complete separation and sought in the nature of the two realities the principle by which in the living individual they act harmoniously. Leibniz started with the principle of individuality, with the unity in fact of mind and body.

I do not propose to enter on a criticism of Leibniz's concept of substance as monad nor to follow the historical analogy further. It is intended only to make clear my own theory. This is that the common-sense and scientific concept of reality is the necessary and natural consequence of the fact that our attention in ordinary life is primarily directed on, and in a certain sense fixed to, the matter which lies outside the percipient's own organism and on the life and conscious activity which are distinct from the percipient's own life and conscious activity. Everything material or spiritual which is brought completely within the acting agent's own instrumental organism, that is, everything which forms part of the mind-body individuality itself is as it were withdrawn from attention. Since, then, our attention is fixed on a nature and life outside our individuality ; and since we are by our own nature rendered unable to direct conscious attention on the processes and structural content of our own organism ; and since of the far greater part of our physical and psychical nature we cannot even by a direct act of attention or by any effort become conscious ; it cannot but appear to us that the unity of this outside world is independent of us and conditions us, and that life and knowledge are dependent on physical matter. We go further, for when we come to see that our own individuality is of the same stuff and continuous with the activity of this outer world and life, it then seems to us that portions of these two antithetical realities are brought together and, either by natural agency or by the power of a transcendent God, have been blended into a cunningly contrived conscious mechanism—man. Because, in other words, the reality which is presented to our conscious attention consists of a distinct and separable inert matter, and a distinct and separate activity, life or consciousness, we conclude that we ourselves are compounded of two natures in relation, mind and body. In biblical phrase, man is dust of the earth formed in God's image, into which God has breathed the breath of life. The new concept arises when by an effort which seems against nature we turn our attention inwards, then we are led to recognize that we

are not at points where two realities converge but at points where two directions diverge ; that the mind-body is not two things associated but one thing dissociated. Then the ultimate concept of reality is not a reality which conditions life and knowledge but a reality which essentially is life and knowledge. What had previously appeared as the condition of life now becomes an opposition which conditions the activity of life.

I propose, then, to consider the relation of mind and body from this new standpoint, a standpoint for which, as I shall endeavour to show, modern physiological research has prepared the ground.

To ordinary observation there appears to be constant and continuous interaction between mind and body, but the great obstacle to the formation of a scientific theory of interaction is the inconceivability of a causal chain in which ideal or psychical facts are interlinked with mechanical or physical facts. Psycho-physical interaction cannot be merely an extension of the sphere of physical causation. Ideas will not do work like the expanding gas in the cylinder of the heat engine. The propagation of a movement cannot be the interchange of energy between corporeal and spiritual things. If there is mind-energy, if the term denotes an actual energy of mental things and is not simply a metaphor derived from a concept of physical science, this mind-energy is not convertible into physical energy, it is confined to a spiritual chain, just as physical energy is confined to a corporeal chain. This incompatibility between mechanical forces and spiritual forces has been the stumbling-block in the path of all interaction theories and has driven philosophers and psychologists to take refuge in theories of parallelism.

The important factor in framing a new theory of interaction is the fact, which we may take to be now established beyond any question, that some disorders of the psycho-physical organism are primarily due to mental lesions,—to what is called a mental trauma. What is now known technically as " functional " disease is, at least in some cases, purely psychological in its origin, whatever physiological

derangements may be its accompaniment. This was unknown and unimagined by the older theorists. The recognition of it completely alters our conception of the nature of the individual mind or soul. It is impossible any longer to regard the mind as the concomitant of certain neurological processes in the body. The mind has a structure of its own. It is an integration of co-ordinated psychical elements or processes—personal memories, tendencies, desires, wishes, and the like,—which mutually repress or inhibit one another, or, as the case may be, interplay with and evoke one another. This psychical matter has an organization as complete, and a unity of living process as perfect, as the physiological matter of the body. The mind is not an intermittent consciousness lighting up with awareness certain states of the organism and dependent on particular physiological processes. It is a structure which can suffer injury, derangement or disorder, independently of the physical derangement of the body. If, then, there be interaction between soul and body, it by no means follows that parts or constituents of the soul must interact with parts or constituents of the body ; it may be that the whole soul, or the soul as an individual, interacts with the whole body as a self-controlled unity of co-ordinated mechanisms. I wish to discuss whether such interaction is conceivable, and, if it be, in what manner it is possible to represent it.

Let me give an example in order to make my meaning unambiguous. I will quote Mr. McDougall's instance of the telegram in *Body and Mind* (p. 268), for illustration only, and without any reference to the author's purpose in the context. " A man receives from a friend a telegram saying ' Your son is dead.' The physical agent to which the man reacts is a series of black marks on a piece of paper. The reaction outwardly considered as a series of bodily processes consists, perhaps, in a sudden, total and final cessation of all those activities that constitute the outward signs of life : or in complete change of the whole course of the man's behaviour throughout the rest of his life." A causal interaction theory would schematize this occurrence somewhat as follows : (1) Physical stimulus (the black marks on the

paper), (2) excitement of the neurones of the visual area of the cortex, (3) vision, (4) excitement of the neurones of the perceptive area of the cortex, (5) perception of physical sign, (6) excitement of the neurones in the association centres of the cortex, (7) perception of the significance of the sign, (8) evocation of memories and projection of memories in the form of imagination, (9) excitement of vaso-motor centres of the cortex, (10) emotions, (11) expression of emotion in glandular activity and skeletal movements, and so on.

In this scheme interaction is conceived as a continuous interplay of physical and psychical factors. The single event, the reading of the telegram, is conceived as a series of separate and independent events in causal connexion. They are stages of a process, and each of the stages might itself in its turn be resolved into a series of independent events. The words, for example, might be considered as preceding the sentence and the letters as preceding the words, and each stage we might choose to mark off in the process would then prove to be neither wholly physical nor wholly psychical, but a series of events some physical and some psychical.

The interaction of mind and body is in my view of an entirely different nature. It is always the adaptation of an attitude of the body to a disposition of the mind. It is therefore the interaction of one system with another system where both co-operate in a common end. I should therefore schematize the occurrence in this way :

(1) An existent attitude of body adapted to a disposition of mind, determined by a long history, modified by new experience. (The reception of the telegram.)

(2) Profound change in the mind.

(3) Change in the attitude of the body adapting itself to the change in the disposition of the mind.

The difference between my scheme and the last is that the reading of the telegram is not two events, first a purely physical action, giving rise to, second, a purely psychical experience. It is one single indivisible event which affects and modifies at one and the same time, though in completely

different ways, two systems. Interaction is always an action of the whole mind on the whole body, or an action of the whole bodily system on the mind. Not only in great shock experiences but in ordinary and insignificant experience there is the same process. Every new experience modifies the whole mind, and the modification of the whole mind entails an altered attitude of the whole body.

The principle can be illustrated equally well if the initiation of the experience be an action instead of a passive stimulation. Suppose I am the sender of the telegram. The execution of the action involves bodily movements of inexhaustible complexity, but the action is simple and indivisible. The state of my mind also while I am performing the action may resolve itself on analysis into an inexhaustible complexity of feelings, thoughts and wishes. But the physical action and the mental purpose are not composite, and the composite parts do not interplay with one another in the causal chain. The whole body or the body as a whole mechanism is at the disposal of the whole undivided and indivisible mind.

What, then, are the two systems ? The mind consists of those factors or constituents or characters of the psychophysical organism which form its personality. The researches of modern psychologists who have specialized in abnormal psychology have revealed to us that personality is a complex organization of psychical or spiritual constituents or factors, of a different order from physical or corporeal matter, and dynamic in their nature. Also this personality or spiritual unity may suffer dissociation, and then we have the phenomenon of a divided or of a multiple personality. Such dissociations are due to a derangement or re-arrangement of psychical matter such as memory, or to a failure or deficiency or deflection of will power. In any case personality can only be expressed in psychical terms, and the psychical constituents to which these terms apply are totally different from, and possess an existence of another order than, that which we express in the concepts of physical matter and energy.

On the other hand, the investigations of the physiologists

reveal to us that the body is a perfect machine, the life of which consists in constant and continuous action and reaction to physical stimuli, brought about by the integration of innumerable co-ordinated muscular actions by means of a perfected system of neural communications. The physiological processes are cycles of physical and chemical changes, and the whole mechanism is resolvable into material constituents and physiological processes, a system of interchange of energy. The initiation of the working and its direction is performed by the mind; the carrying out into action by the body. The corporeal cycle is a closed system: it receives its energy from the physical world and returns the exact equivalent in work and heat.

Physiologists are not agreed as to whether the life of the body can be expressed in the mechanical terms of the particular vital processes. The life belongs to the processes as a centrally controlled, centrally co-ordinated, whole. But the life is not the mind, and there is a life of the mind as there is a life of the body. Whatever be the nature of the vital principle it is included in our concept of body when we distinguish body from mind. It is not the corpse but the living body which we distinguish from the mind when we consider the interaction of mind and body. In the actual psycho-physical organism there is a living unity of physiological process, and a living unity of psychical experience.

It is important to keep distinct the problem of the relation of life and matter and that of the relation of mind and body; or rather to distinguish the life which we oppose to matter from the mind which we oppose to body. When I speak of body in this relation, I always mean living body and not its physical constituents in contrast to its life. The two problems resemble one another, inasmuch as both life and mind stand for a unity which confers concrete individuality on the manifold particular processes it co-ordinates. The difference is that life gives individuality to a group of material constituents undergoing a cycle of physiological processes, while mind gives individuality to the experience, that is, to the conscious or attentive processes of the living organism.

The narrower problem may lead up to and depend upon the more general, but for our present purpose we are concerned only with the particular problem of mind and body.

We may, then, state the problem of interaction as the reconciliation of the two following propositions :

(1) The constituent factors of the mind and the constituent factors of the body are absolutely heterogeneous, and there is no common factor in psychical and physiological process.

(2) There is a continuous adaptation of mind and body, so that a change in the disposition of the one entails a change in the disposition of the other.

It may be thought that the first of these propositions of itself negatives the theory of interaction and compels us to adopt the alternative theory of parallelism. There seems to me a simple reply to this. We can point to two facts which themselves are facts of interaction. Interaction is therefore not a theory to account for facts but a fact to be reconciled with other facts. The two facts are, first, that all changes in the mind are mediated by the living body ; and, second, that all actions of the living body carry out the purposes of the mind. To go back to the illustration of the telegram,—the mind is absolutely dependent on the body for the recipience which makes the purely spiritual change ; and the body bears in all its subsequent actions the direction and characteristic expression which the mind has imposed. The body is the avenue to the mind of the experience which changes it, and the body is the outlet to the mind of the action which expresses that change. There is no parallelism here but interaction, whatever be the nature of the interaction. In neither case is the physical fact parallel with the psychical. In the first, the psychical fact is responsive to the physical fact ; in the second, the physical fact is responsive to the psychical fact.

Let us then inquire, what is the nature of soul or mind as it is revealed to us in the objective study of psychical phenomena ? Also what is the nature of living body as it is revealed by the study of physiology ? And then what is the nature of the synthesis or union of these two natures ?

Let us begin, then, by considering the nature of mind or soul. It is useful to retain both terms, even though we mean to indicate by them an identical reality. When we use the term "mind" we seem to throw emphasis on the intellectual side, while when we use the term "soul" we seem rather to emphasize the sentient and emotional side of our spiritual nature. We are not in the first instance conscious of the mind as an object distinct from the body, we apprehend it rather as a distinct kind of quality which some objects have and others have not. We are accustomed to use the term "mind" simply to indicate mental qualities, and the term "soul" to indicate the individual character of the whole of these qualities. Then again we use the term "soul" to comprehend the psychical as distinct from the physical qualities of every material object which is living, and we further distinguish the rational soul from the animal soul and the animal soul from the plant soul. The soul or mind which I am now opposing to the living body is the rational soul. It seems to consist in and depend upon the possession by a living creature of two faculties, one passive, a faculty of being conscious or aware, the other active, a faculty of desiring or willing. The first is a specific knowledge of the body and its environment, the second a specific tendency to responsive action by the body. In each case a mental quality seems to characterize a sensible object, and the soul seems to be the common term for these mental qualities. In other words, it seems as though the soul may be the phenomenon of consciousness or awareness, exhibited by certain living material objects, possessing a definite kind of organic structure, together with the power of purposive action which such endowment brings with it. When we consider the nature of this consciousness, however, it becomes evident, and can be clearly and directly proved, that consciousness is not the quality of a sensible object but the manifestation of an individual, spiritual, that is, of an immaterial, object. This definite immaterial object is the soul. What is the proof of this? And why, if true, is it not immediately evident?

The reason why, if true, it is not immediately evident

is clear when we consider the conditions in which our own individual consciousness arises. The world presents itself to our mind in the first instance as an aggregate or congeries of distinguishable spatial objects, each having a nature of its own. We are each of us one among these juxtaposed and displaceable objects. The object I call "me" possesses a special quality of consciousness or awareness. Other objects also seem to possess this quality, but not all. The vast majority, indeed, seem by their pure passivity to be without it. What, then, does this quality of consciousness appear as? It seems at first extremely simple. Consciousness is my awareness that I am an object among other objects. This seems to be a passive quality in so far as it is an affection of the object "me"; and an active quality in so far as it relates me to other objects which are not me. If I assume *the existence* of these objects, then one way of imagining what consciousness or awareness is will be to represent one of the objects as possessed of the quality of being aware of the presence and nature of the others. My knowledge will seem to depend on a faculty in me to contemplate *what exists*.

When, however, I look more closely at the nature of this knowledge, *and make no assumption about existence*, I see that it is not and cannot be contemplation. That is to say, knowledge may include contemplation, but cannot itself simply be contemplation. It is of a different and altogether more complex character than contemplation; it is recognition. The immediate contemplation by one object of another object or of other objects, granting there may be such a thing, would not be what we call knowledge nor even consciousness or awareness. To be conscious or aware of an object is not to contemplate it but to recognize it. Recognition implies precognition, whereas contemplation purports to be simple and immediate, and of itself implies no previous acquaintance. Recognition supposes memory and also constructive imagination, without which memory would only be recollection of the past, not knowledge of the present. Remembering and imagining are not qualities of sensible objects. We are forced, in order to give meaning to the

terms, to oppose mind to matter. Memory and imagination are qualities of an intelligible object, the mind, and not of a sensible object, the body. Their nature is spiritual and not material.

There have, indeed, been many attempts to show that memory may be a material fact. It has been suggested, for example, that it is one in kind with the trace which every material thing, however great its resilience, even flint or steel, seems to retain of every force which has acted upon it. But this is wholly to misunderstand the nature of the fact, and is due, no doubt, to an ambiguity in our use of the term memory. We use it to designate two wholly distinct conscious phenomena, namely, first, the pure record of our past experience which we retain and recall at need, and also second, the disposition or habit of repeating past experience which is either innate and part of our nature, or else acquired by practice. This habit-memory, the memory which repeats, is a motor disposition, and therefore dependent on the setting up of mechanical contrivances in the psycho-physical organism. Pure memory, on the other hand, is unintelligible as a material fact. If there be any one thing which we can point to and say, this is spiritual, mental, psychical, and in no sense material, it is memory.

It may still be objected, however, that this only proves that memory cannot be considered as the quality of a sensible object in so far as that object is purely spatial. But, it will be said, every spatial object is also in a time relation, the living body is spatio-temporal. May not memory and imagination, then, be temporal qualities of sensible objects, that is, qualities of living bodies enduring through the continuity of a changing process? The reply is that memory is not static and mechanical. We do not remember indifferently what has happened to us, and the vividness of our memory is not proportionate to the strength or weakness of the original sense stimulus. We remember only what has interested us and what to some extent consciously or unconsciously has engaged our attention. It is the direction of this interest, and not the actual mechanical

modification of the sense-organs, which determines what shall and what shall not form a record. How can such a record be mechanical? Our body contains various and innumerable reflex mechanisms, continually giving immediate and automatic responses to definite stimuli, but no imaginable complexity of such reflexes would yield memory or imagination. Memory represents the past, imagination the future, not according to a scale of sense impressions or of physical stimuli, but according to the organization of a special interest.

This leads to the main consideration. Memory and imagination do not pertain to the continuity of physiological process in the body, but to the unity and continuity of conscious experience which we term the personal self. The continuity of living process in the body and the continuity of conscious process in the mind are not one and the same continuity. The two continuities are in relation, for there is neither affection nor action of the mind save by means of the body. But the mind is a continuity of conscious experience quite distinct from the continuity of living process, and quite different in its nature. The two continuities do not even present a point-to-point correspondence. There are breaks in the bodily condition of consciousness,—normal breaks in sleep, abnormal breaks in certain diseases and on the occasion of injuries or poisons,—and these breaks are of varying duration. Yet, however long the interval between the states of consciousness, there is no break whatever in the continuity of the consciousness. When we awake from sleep or when consciousness returns after long coma, we are one and the same person in everything which concerns the conscious continuity. No external stimulus nor internal cerebration which may take place during periods of unconsciousness enters into or goes to constitute the continuity of memory which is the personal self. It is true we may dream and may remember the dream, and the mind may be affected by it after waking, but it is the dream we are conscious of having had when we have awakened from sleep, not the actual dream consciousness itself as it occurred in sleep, which enters into the personal memory record. On

the other hand, there may be breaks in the continuity of the personal self-consciousness when there is no break whatever in the continuity of its bodily condition. In such case we have a wholly different kind of derangement. The break may take the form of an amnesia, and according to its extent and severity there will be a disruption of psychical unity. Or it may take the form of complete dissociation and give rise to the condition of double or multiple personality. It is evident, therefore, that there is a unity and continuity of mental process, distinct from, and other than, the unity and continuity of physiological process, whatever be their mutual relation.

It is, however, when we consider the conative rather than the contemplative function of the mind, when we consider desire, volition, action, rather than perception, memory, imagination, that we are made aware of a definite mental structure. Our psychical nature is based on innate instinctive impulses which are for the most part unconscious. Up to quite recent times these psychical dispositions were regarded in a general way as the necessary accompaniment of the natural functions of the bodily organism. More especially the biological necessity of sexual reproduction, which in the higher animals involves the union of individuals organically distinct but complementary to one another for the reproductive function, was supposed to have given rise to the sexual instincts. The sexual instincts were supposed to have undergone further modification in evolution, and to have called forth auxiliary instincts with appropriate emotions, such as parental affection, tender emotion, gregariousness, and so forth. These again were supposed to be the basis of our social and political institutions. Our unconsciousness of this instinctive nature was simply taken to be evidence that it belonged to our brute bodily organization, constituted our animality, and was wholly irrational. In the light of modern investigation we have had to revise the whole concept of this unconscious nature, and to replace it with the concept of unconscious mind.

To the older psychology the unconscious mind seemed a contradiction in terms, for mind was generally a synonym of

consciousness, and the unconscious was therefore the negation of mind. No one now quarrels with the term, though there are many theories and acute controversies concerning the fact. These I shall avoid as irrelevant to my present purpose. I will confine myself to indicating a few now generally accepted facts which clearly imply a definite mental structure analogous to the bodily structure, and a definite unity and continuity of psychical process analogous to the co-ordinated unity and continuity of the physiological process.

The first of these facts is that which psychologists term repression. There are certain instinctive tendencies to actions which we habitually repress, and this repression is specific and constitutes nature. It is automatic and unconscious. For example, the whole mental and moral development of human nature, that is to say, the particular and definite form it has assumed in civilization, is dependent on the control of the reproductive instinct. This is a psychical not a physical control; for it is the expression of the instinct, not the instinct itself, which is repressed. Repression is effected by the holding back and suppressing of the "wish" or imaginative form in which conation asserts itself, so that it is kept from emergence into consciousness. There is a repression exercised by consciousness itself. This is very common experience and of everyday occurrence. But there is a repression of which we are altogether unconscious, and this is proved by abnormal psychology and also confirmed by many delicate experiments on normal subjects.

The second fact which seems to be established is that there are planes of unconsciousness. If we take as the plane of consciousness not merely what at any moment is within the central zone of attention but what is within call of the mind in memory, then there is below this a whole range of definite psychical content which cannot of itself reach consciousness and which is only revealed under special circumstances, normal or abnormal. We may, for example, under hypnotic conditions bring back memories or re-live conations which in ordinary conditions are unrecoverable. There is evidence of deeper and deeper planes.

According to the well-known theory of dream interpretation of Sigmund Freud, it is from deep and ordinarily inaccessible regions of our mind that the substantial material of the dream life comes. However that may be, we may regard it, I think, as established that whole regions of psychical matter lie beneath the manifest mental activity of attentive consciousness.

The third fact is that this unconscious mind is not inert but active, not dead but living. Its constituents, like the cells of the living body, have their own individual life. In normal healthy life the deeper strata are inhibited and controlled. The inhibiting and controlling power is exercised by the mind, and the character and variety of the inhibition constitute the individuality and personality of the mind. Personality may, however, become disordered, deranged or, to borrow the analogous term in the pathology of the organism, diseased. Then the repressed and inhibited constituents break away from control and run riot, and give rise to the familiar symptoms of hysteria, or, it may be, to the more serious symptoms of dissociation, or to final and irreparable ruin in dementia.

We are entitled to say of these facts, apart from anything in regard to them which is hypothetical or mere theory, that they point to the existence of mental structure. Memory, imagination, desire, conation, tendency, wish, are psychical matter, and they are organized to form an acting unity, and this unity is the personal mind. The constituents of it are of a different order of reality to that of the protoplasmic movements, cell physiology, metabolism, muscular contractibility, glandular secretion, nervous co-ordination, and the like, which constitute the living body.

Is it not possible, however, it may yet be urged, that the mind is identical with and a development of the principle of life? Whatever be the origin of life and whatever the nature of the principle which has determined the direction of the energy of the changes of carbon compounds and evolved specialized vegetable and animal forms, is there not, it may be asked, an uninterrupted progress in this direction until we reach the rational soul? The reply I

offer to this, so far as my present purpose is concerned, is that whether or not the problem of life be ultimately one and identical with the problem of mind, the actual fact before us is the problem of two distinct orders, an order of living body and an order of thinking mind. The interaction of mind and body is not the problem what life itself is, but in what way a mind, being an organization of spiritual experience, can act in and through a living body constituted of material elements and mechanical movements. Every man whose mind is normal recognizes, as soon as he understands the proposition, that two straight lines cannot enclose a space, and every man whose body is normal maintains from birth to death a blood temperature of 37° C. The two facts belong to different orders, and it is inconceivable that the two facts can interact in such a way that one might be the cause or the effect of the other. Yet the two orders do in some way enter into one system, for both are essential to one personality.

Let us now consider the nature of the body. The body is, what the mind is not, a sensible object. It is one among the objects or things which constitute the sensible world. It is presented by means of sensations, and is in spatial and temporal relations with the other objects of the sensible world. The term " sensible " implies a relation to mind, for object sensed implies subject sensing. There is no escape from this relation. On the other hand, there would be no advantage in escape, were escape possible, for the whole problem of knowledge and existence is the problem of presenting reality to the mind in a form which is self-consistent. The relation of object to subject expressed in the words " sensible object," the relation of object to subject in knowing of every kind and order, is not, however, the relation between the body and the mind which I am now seeking to make explicit, because in this meaning the mind as well as the body is an object to a subject. The body is a sensible object to a sensing subject, the mind is an intelligible object to a thinking, that is, an imagining and reflecting, subject.

The body, like other objects in the sensible world, is

spatial; it excludes other objects, and is juxtaposed with them. It is changeable, for it occupies different positions at different moments. It is changing, for it alters internally continuously, and according to a principle or law. It is temporal, for its state at any moment is determined by its state at the previous moment. As an object it can be classified according to any order or arrangement to which physical objects conform.

To each individual, however, his body is a privileged object. It is the constant centre of all objects, and the changes in all other objects are primarily for him changes in the relation of other objects to the body. But it is also privileged in a still more special sense. It is the means and the only means by which all objects, itself included, are known, and the only means by which desires and wishes are expressed. Also it is a privileged object in the sense that it alone among all objects is known not only by sensations but also by affections or feelings. We know our body, not only in the way we know all sensible objects by the sensations we have of it, but also in the feelings by which the sensations of itself and of other objects are accompanied. So it is that some knowledge of our own body appears to be a necessary accompaniment of any knowledge of any sensible object. For example, when by touch I am made aware of an external object I am also at the same time aware of my own body as the surface touched, and this even if the object touching is also part of my own body. Nevertheless, although the body as an object has these privileges over other objects, we find no difficulty in abstracting from them and considering the body purely as belonging to the general class of external material objects. Indeed, it is only by doing so that we have come to know anything of importance about the body. Its special privileges give us no insight into its nature and function. We know absolutely nothing of the internal structure and of the physiological processes of the body by reason of the fact that the mind dwells within it and is dependent upon it for all it knows and does. In fact, our individual mind, notwithstanding its specially privileged position in regard

to one object, is not thereby endowed with special knowledge of the nature of that object, nor equipped with special means of becoming acquainted with its living processes. Knowledge of physiological process cannot be gained by introspection but only by external observation. It is gained by means of sensations, perceptions and judgments, not by feelings.

The living body is a cycle of physiological processes, performed by means of mutually adapted structures, automatically co-ordinated and controlled. The great majority of these processes are involuntary and unconscious in the absolute degree, and in those processes or parts of processes in which there is consciousness and volition the consciousness and volition seem independent of the efficiency of the actual process. If the consciousness take the form of sentience, pain or pleasure, it appears as merely an accompaniment of the process, not as an essential constituent of it. If it take the form of reflective consciousness or awareness, it then appears, though accompanying the process, to be altogether detached from it. We can and we do conceive the living body as complete in itself without the accompaniment of consciousness, either in the form of simple sentience or in the form of apperception. And yet this accompaniment of consciousness, whether it be simple sentience or cognition, always seems to fulfil some manifest biological purpose. Also unconsciousness, in those neural processes from which consciousness is absent, is not merely negative, its absence fulfils a biological purpose. Unconsciousness may be simply an absence, or it may be positively acquired, the automatism of habitual action, in either case we may find its ground in a biological utility.

Yet although the physiological processes of the living body seem independent of the particular form of consciousness or unconsciousness which may accompany them, this conscious accompaniment is conditioned by special structures and special processes in the living body. Part of our organization has for sole function sentience and responsive volitional action. Such structures are : the sense-organs which consist of specialized nerve-endings disposed in varying groups over

the periphery, enabling a minute discrimination of external physical stimuli to be experienced; the special nerve-endings beneath the skin or in its deeper layers which give rise when stimulated to pain-sensations; special nerve-endings sensitive to muscular, glandular or vascular fatigue which give rise to vague feelings of general comfort or discomfort; the richly innervated organs of the special senses, the retina, the organ of Corti, the semicircular canals, the organs of taste and smell, which enable us to discriminate definite ranges or distinct classes of physical stimuli. Then there is the great central organ itself, the brain and spinal cord, to which every single sentient end-organ communicates directly its particular fibre and whence special fibres descend with the volitional impulses to every muscle under volitional control.

There is an important character of the structure and function of neurones which recent researches have disclosed. This is the individuality or rather the specificity of each constituent cell with its fibres. The older theory of specific nervous energy merely affirmed the general specificity of groups of sensory and motor neurones, particularly those associated with the special senses. It now seems probable that this specificity belongs to every constituent unit of a group and not merely to the group as distinguished from other groups. All action mediated by neurones takes place on the all-or-nothing principle, and the function of one neurone cannot be performed by any other. At least it seems to me that all the direct experiments, such particularly as the well-known experiment of Dr. Head on the innervation of his own forearm, tend to confirm this generalization.[1] The living principle, whatever it is and however we name it,—entelechy, *élan vital*, life-force,—manifests itself in the co-ordination of multifarious specific processes of constituent cells. This function of co-ordination is not exercised by any specific structure. At any rate, no such structure is known and there is no reason to suppose it exists undiscovered. The function is exercised indifferently whether the constituent elements be many or few, and the

[1] See *Brain*, 1908, vol. xxxi. p. 137 *et seq.*

number of cell-constituents varies enormously between individuals of different species of the same generic type. The mechanism by which co-ordination is effected can be located in the cerebral cortex, the function of which may be likened to that of the switchboard in a telephonic exchange. The ultimate nature of the living body seems therefore to be the co-ordination on an enduring principle of an immense numerical aggregate of independent specific units.

Let us now consider the heterogeneity of these two natures. When I speak of the heterogeneity of mind and body, and point to the absolute disparity between mental and physical (including physiological) process, I do not mean that we can form class-concepts of minds and of bodies as unrelated realities. It is easy to see in the case of the mind that the possibility of presenting it as image or as concept depends on its relation to the body. We can only define what anything is by what it does ; what does nothing is nothing ; and whatever the mind does it does by means of the body. We may abstract the mind from its relation to any particular body, but we cannot give expression to the thought of a mind without imagining for it some embodiment. This has been the favourite criticism of animistic theories ancient and modern. It is impossible even in thought to present the idea of pure unembodied spirit. The converse is also true in so far as the concept of one's own living body is concerned, but it is not so immediately obvious, and would at least require the support of argument to bring conviction. It is really impossible for me to think that my body without my mind is still my body. I may place myself in thought as a spectator at my own cremation, but only by the artifice of an imagined embodiment which enables me to present my body to my mind as no longer my body. Or, again, consider a case like the pathetic picture which Nietzsche's sister has given of the last years of her brother, truly a picture of living death. There is the living body surviving the dead mind. In presenting that living body to our mind as still Nietzsche's body, we are, in fact, employing the artifice of

a new impersonation. We must place Nietzsche's mind within his body in imagination in order to conceive its absence in fact. The problem of heterogeneity is not the problem whether a dissociation of mind and body is or is not conceivable.

If, then, mind and body are heterogeneous and yet neither existentially nor conceptually separate, does the heterogeneity consist in the double aspect which psycho-physical action assumes ? Is mind the aspect of that action when regarded as purpose, body its aspect when regarded as mechanism ? The specific character of mental process is the representation in idea of the end to be attained ; the specific character of physical process is the determination of counteracting forces in a resultant. Every action or process, whether we class it as material or vital, as conscious or unconscious, presents to the observer this double aspect, the resultant can be viewed either as determined by a final cause or by an efficient cause. The resultant is one and the same, however viewed. A process of crystallization or a process of organic metabolism can be read purposively or mechanically, but it is the same set of facts, whichever way they are viewed, and whatever kind of interpretation the external observer seeks. There is, however, in a system or body in which mind is immanent, the emergence of a phenomenon which is not found in any merely mechanical system of interacting forces. This is conscious or purposive adaptation. It manifests itself as a direction of physical forces, already existing, toward the attainment of an ideal which it presents as an end. In this we have the distinguishing characteristic of mind, that which raises it, so to speak, to a higher plane than that of mere natural fact. Yet this is not the characteristic which seems to me to constitute the fact of heterogeneity ; rather, I should say, it is the heterogeneity of mind and body which is the ground or condition of this characteristic.

This heterogeneity is based on a certain fact which we directly experience and also may indirectly observe. It is that every new experience from the instant of its historical apparition enters into, submits to, is incorporated within

two disparate systems. Each system has its own kind of order, its own specific nature, and its own peculiar function. The union between the two systems consists in a relation of mutual interdependence, but it is the systems which are interdependent. It is not a point-to-point union, nor a point-to-point correspondence of the constituent parts of one system with those of the other. Thought and action, though mutually dependent, form each a system; the one is the psychical organization we term the mind, the other the co-ordination of mechanical contrivances we term the body. We cannot call into activity a part of the mind without calling into activity the whole mind. We cannot exercise a particular mechanism of the body without affecting the whole disposition of the body.

When I feel, perceive, think and will, what is it in me that performs these acts of feeling, perceiving, thinking and willing? Why do I attribute these acts to my mind and not to my body? Why do I divide myself into these two parts or attribute to myself this dual nature? What is the difficulty in assigning all my psychical acts to the brain, and in supposing that my brain thinks? Many contemporary philosophers are inclined to consider this a possible hypothesis, and the new theory of "Behaviourism" seems an attempt to give it philosophical expression. I find no inherent difficulty in the notion. It does not seem to me absurd, nor antecedently impossible, nor even antecedently improbable. The theory that the brain thinks or that the mind is the brain is not the same as the theory that the brain secretes mind as the liver secretes gall. Such a concept rests on a false analogy. As the ovary secretes the ovum, would have been a truer analogy. But then, as the ovum becomes the embryo, the absurdity would have been manifest. I see no incongruity in attributing to the brain, because it is ultimately resolvable into a constellation of physical atoms, a psychical function. My reason for rejecting the simple statement that the brain thinks is that it seems to me untrue in fact. I can imagine that the brain might think and feel and will, but what I cannot imagine is that thoughts and feelings and volitions, if they were acts of

the brain, could form the mind. They could in a certain way hang together, no doubt, and they could have the unity which comes from being owned, but could they of themselves form an organic individual system such as the mind is? I find it, then, impossible to believe that, as a fact, the brain thinks, because I find that, as a fact, the brain is not the mind. If there be two things, the mind and the body, and the brain is part of the body, then it seems to me it must be the mind and not the brain which thinks. But what is the proof of it? It seems to me clear that, were it the brain which directly exercises the psychical function, then acts of feeling, thinking, etc., would be disconnected, detached, and detachable, or combined, if they were combined, on an altogether different principle from that which I find. As a fact, I can never detach one psychical act from other acts, or attach a psychical act purely and simply to a physiological process, it is always one and indivisible with the whole psychical organization I call mind. It belongs to the system of my psychical experience, and to present it as belonging to the system of mechanical contrivances which I call my body and to the particular co-ordinating connexions of these which are the part of my body I call my brain, is to me a pure incongruity. Even the simplest, most elementary psychical act is the act of a mind. Its character, its tone, its subordination to purpose, emanate directly from the organization of an individual whole of psychical acts. Thoughts, ideas, meanings, desires, wishes, imaginations, feelings, sensations, are not a chaos, a disconnected manifold. They do not float loosely, and they are not indifferent to the principle of their combination. They are owned, not by the brain, but by the personality which they themselves constitute, the mind. Test it in the simplest case of mere sentience. Suppose the stimulation of a pain nerve-ending. The pain which follows may seem instantaneous, and may be followed by an automatic muscular response, but it is not a pure reflex. For it is only if I experience pain that it is pain, which means that to be pain it must be a state of my mind. It must modify my whole personality. If my mind exclude it, it is

absolutely ineffectual, practically and actually non-existent, even though the stimulation remain in the form of physical injury, and the neural course be unimpeded. There is no way of detaching the pain as a psychical element from the mind, and attaching it and confining it to a particular neural process; and it is the whole mind, not a detached psychical factor of it, which intervenes to bring about the new bodily disposition.

We find another and yet more striking instance of the heterogeneity of mind and body in the general phenomenon of the animal mind. The mental equipment of different animal species seems always proportioned to the conditions of the animal's life, and never and in no respect proportionate to neural matter, or to the complexity and quantity of specific contrivances. There are large mammals which possess at least fifteen thousand times as many neurones as the smallest mammals. Does any one, therefore, credit them with fifteen thousand times the sentient or intellectual capacity? But if the brain thinks, why not? Leaving aside the problem of magnitude, when we compare one animal with another, we are struck with the remarkable difference between one species and another in the extent to which mind serves it in its activity. A rat, for example, shows more cunning than a rabbit, or a sheep, or a horse, yet it is not better equipped neurologically for its special activities than they are for theirs. It is clearly a case in which intelligence has been developed because it serves the species in the peculiar routine of life to which it is adapted. A striking illustration was afforded a few years ago at the Zoological Gardens in the case of a Polar bear, a creature which, judging by its structure and position in the animal scale, might be expected to exhibit a high degree of common intelligence. When placed in new quarters on the Mappin Terraces, it fell over the parapet into the surrounding foss. Obvious and perfectly simple means of return were offered it, but instead of availing itself of them it displayed for several days an amazing amount of what appeared as sheer stupidity. The explanation zoologists offered was that its mental equipment was adequate to the conditions of its

life, the routine of which in its native seas, where no natural enemies are laying snares for it, seldom presents a complex situation, or one that calls for the exercise of cunning.

The acquirement of skill affords another illustration of what I mean by the heterogeneity of mind and body. The skill of the musician, the mechanic, the professional scientific practitioner, is acquired by an activity orientated in the inverse direction to that which we associate with the growing, widening, and developing mind. It even depends for success on a certain inhibition of pure mentality. Skill may almost be defined as the power of performing complicated actions without thinking. Reflective or discursive thought, which is the essence of mind, interrupts the work of skill. Yet the acquirement of skill is not independent of, nor indifferent to, the brain. Not only does it involve a development of neural process, but almost certainly a development of the higher cerebral centres—those which we imagine to be most immediately concerned with rational processes. Skill supposes an enormous work of co-ordination, and the cerebral hemispheres are the seat of this co-ordination. Here, therefore, we have a case in which brain development is quite disparate from mind development. On the other hand, the cases are almost proverbial of the want of skill in the ordinary affairs of life displayed by men of vast intellectual attainments. Mental giants sometimes act as children in matters of daily life. It may be, of course, that the intellectual development is due to other and different nervous co-ordinations or to other kinds of nervous contrivance, but whether this be so or not, it is clear that in the case of skill the brain hypothesis is largely explanatory, in the other case it is not. The reason is important. Muscles are involved in the case of skill, and muscles are wholly controlled by nerves. In the case of mind, thoughts, ideas and meanings are concerned, and their direct relation to nerve is purely hypothetical. Nerves are the channels or pathway between the mind and the world external to the body, but that they cause or control or originate the mind there is no evidence.

At this point it may seem that the animistic hypothesis

offers the easiest solution of our problem. It is the most ancient and the most venerable, and this of itself may incline one to suspect that it may be true after all. May we not schematize the relation of mind and body on the analogy of the charioteer who with the reins in his hands guides and controls the living horses, making them subserve and fulfil his purposes? May not the relation of the soul to the living body, though infinitely more complex, be yet ultimately as simple as this? Should we adopt this view we might then suppose that each sensation was a demand on the attention of the soul, a call to it to take account of the situation and direct the response. And this the soul might do either by leaving the response to the automatic reactions or by co-ordinating new ones. In any case we should represent the soul as distinct in its nature and function from the living body, able, perhaps, like the charioteer to step down from the chariot and at need to mount another. The analogy is tempting and up to a point it agrees with the facts. It is therefore very important to indicate clearly the exact point at which it fails, and also the completeness of the failure. It fails to explain the fact that the mind *is* psychical experience and not something which *has* psychical experience. The problem of mind and body arises in the fact that psychical experience organizes itself into mind, and then stands as an organic or systematic whole over against the bodily system.

It seems to me certain that the forces, whatever they are, which are moulding the body and adapting it to the specific activity of the living creature are the identical forces which are forming the mind and organizing it into the personal unity. I say it seems to me certain, not because I think the contrary inconceivable, but because all the facts when considered without prejudice support this view, and because I can think of no reason why I should suppose there are unknown facts which would invalidate such a conclusion. Moreover, there is one fact which seems positively to clinch it. Every individual has an ancestry and proximately arises from two parents. In the fertilized germ, potential mind and potential body are indistinguishable. Together

they part from the parental stock and enter on individual existence. I find it impossible to believe that the mind is generated by some separate process or arises independently of the force which generates the body.

I will now state my own theory, and I will do so by first of all presenting its metaphysical basis in abstract terms, afterwards trying to show how it is exemplified in the common and acknowledged facts of experience.

The ultimate reality I can best indicate by the term "life." Life is a very general term and more often used as an adjective than as a substantive. I mean by "life" existence as I immediately experience it in living. I mean therefore what some philosophers term conscious experience, or simply experience. It seems to me to be what Descartes meant by his "I think, therefore I am." Thinking is the ultimate fact behind which even thought cannot get. This immediate knowing of life in living is pure intuition, that is, a form of knowing which is non-intellectual. When we reflect on this life and form a notion of it, when we ask what it is, we find that there are involved in the notion two concepts which are essential to it, the concept of activity and the concept of duration. It may be said that these are but expressions of a more general notion which underlies them, the notion of movement or change. I prefer to identify change with the general notion of life, but I am now considering life as each individual conceives it in reflecting on his experience. To the individual, life is centralized and determined. It is the activity which is confined to a definite present moment, and also it is the duration of progressing action. There is, therefore, a dichotomy in the very notion of life. It splits into two antithetical notions and these stand over against one another and are mutually exclusive. The notion of activity seems to concentrate or focus all reality in one intense but isolable instant and to exclude from the present moment what has been or will be, while the notion of duration brings into the present moment both past and future. It appears to me that we have in this dichotomy of thought the essential principle which underlies the duality

of mind and body. The body is the concrete realization of the activity of life, the mind the concrete realization of its duration.

Some of the most obstinate problems of philosophy are due to a natural disposition of our intellect which inclines us to dissociate thought and action, thinking and doing. We regard deeds as alone real in the full sense of actuality; thoughts possess a shadowy kind of reality which they derive from deeds. Consequently the living body which at each present moment is actually doing the action essential to its life seems not only the centre of activity but the whole activity and the source from which the mind derives its reality. But if the living body is necessary for the performance of action, the enduring mind is equally necessary for the unity and continuity of the action.

When we try to form the distinct concept of the living body apart from the concept of the informing mind, it is at once evident that our notion is of an unenduring thing, that is, a perishing and not a persisting thing. We conceive, it is true, a continuity of purely bodily existence. We picture the continuity of the body of an individual from birth to death. The same body seems to us to go through the most complete changes, changes both of matter and form, in infancy, maturity, and decay. At any present moment the body is an aggregation of material constituents with a certain arrangement of juxtaposition in space, and an order of succession in time. Ordered succession is implied in physiological process. The state at every present moment is determined by the state at the preceding moment. But this is not the concept of duration; on the contrary, it is the concept of the succession of momentary existences lapsing into a non-existence which is absolute. The living body concentrates its whole activity in one present existent moment, and it perishes with that moment. Its continuity is a continuity of perishing. It does not share its existence between two moments in such way that part of it exists at one moment, part at another. Its existence at one moment means that it has ceased to exist at every other. We cannot form the concept of mind

on that model. Duration is as essential to our concept of mind as non-duration is essential to our concept of body. Duration means the continued existence of the past and its comprehension within the present ; non-duration means the continual going out of existence and new creation of the present.

Living action therefore involves for its actualization two systems antithetical in their nature and divergent in their direction. Each of these systems organizes itself continuously round one and the same individual centre of activity, and its organization is the necessary condition of realization in action. One secures to living action its duration and gives it its free self-determining character. The other secures its efficiency and gives it mechanical necessity, inserting it into the universal system of interacting forces. Such is the nature of the antithetical systems which it seems to me are necessarily formed round every centre of life, realizing the twofold character of action—duration and efficiency. Can we present the scheme of the genesis of these two systems, and will this throw light on the problem of the nature of their interaction ?

Living process, as I conceive it, is a progressive dichotomy. Throughout the realm of individual experience the fundamental principle of development is a dichotomy of thinking and acting. By the term dichotomy I wish to emphasize that the process of experience is single not twofold in its origin. Living experience is the continual differentiation of what is at first undifferentiated. The differentiating is not a mechanical division into parts, it is the imposition on the same material of two orders of arrangement, each following a different principle, but each order the necessary complement of the other.

I will try to illustrate what I mean by taking first a simple case, the simplest case I can imagine, then a more complex case. I will suppose that a single pain-terminal in my body is excited by an adequate stimulus. The result is a psycho-physical event, as simple and unique as an event can be. It is physical and it is psychical. The pain is psychical, and the stimulus is physical. A later reflexion

may separate them, but existentially they are inseparable; they are not experienced as two events in a causal relation. Yet this one single experience in its very nature affects two wholly distinct systems, the mind and the body. In the mind it is undifferentiated pain, vaguely localized, and referred to something hurting. In the body it is the specific functioning of a specific minute structure, responding to a specific stimulus. This structure is not interchangeable with any other so far as its function is concerned, yet it is in coordination with the whole body as a physiological system. And now let us consider a more complex and complicated case. I will suppose I am watching a violinist performing. I have before me quite clearly mental process and bodily action. Were there only bodily action I might hear sound or noise but not music. Yet for me there is only one fact, and it seems to me also that for the violinist there is only one fact, his living action; but this one fact necessarily enters his mental order and his bodily order, and each is changing at every point of the progressing action. Each order, the mental and bodily, is changing, however, on a totally different principle, so that there is not and cannot be a correlation between a constituent part of the one order and a constituent part of the other. His living action is not uniting two diverse facts, nor holding in a fixed correlation two series of facts; it is creating two different orders. My theory is, then, that living action is not the unifying of an original diversity but the dichotomizing of an original unity.

If this be true it seems to me the whole problem of interaction, as hitherto understood, is transformed. Mind and body arise in the very process of living action, and arise, not at some moment which we can fix or imagine as the absolute beginning of living action, but arise continuously from moment to moment of the progressing development. Every modification of ever-changing experience is a modification of mind and body, each in its individual integrity. The antithesis of the two constitutes the essential nature of living action. The principle of living action is an organization of ends, an organization of means, and a continuous adaptation of ends to means and means to ends. The

organizations realize antithetical principles ; the one achieves freedom, the other necessity. The notion of means involves rigid determinism,—a means which is not the necessary means is not a means ; the notion of end involves freedom,—a necessary end is not an end. The dichotomy itself is grounded in necessity. It is because the principles are antithetical that each must organize itself independently of the other. There is no common quality of mind and body and no common measure between them, which would render it conceivable that mental things and bodily things should enter indifferently into either a mental or a bodily process. Equally inconceivable is a mind without embodiment, and a body without mind to give purposiveness to its co-ordinated processes. It is only as whole and individual, and not as composed of classes of discrete entities, that mind and body are in perfect union in a relation of absolute mutual interdependence.

The term which seems to me best adapted to express the interaction of the mind and the body is solidarity. The old legal meaning of this word exactly fits the notion. It was originally a term of Roman and Civil law to express the character of a contract which, in a single matter, involved individual obligations on the part of the contractors severally, with corresponding rights to the holders. The term solidarity means, therefore, that diverse, even divergent, activities together bring to pass a single common result to which all the activities contribute without sacrificing their individual integrity. The term causality, on the other hand, as used in physical science (apart from any question as to the legitimacy of its employment therein) means that in some way something which is distinguished as cause disappears, and its exact equivalent reappears in something which is distinguished as effect. The interaction of mind and body is not of a causal but of a solidary nature.

I can now, I think, make clear my scheme of this interaction. Let us call living action A, then we may say that every A is B C, these standing respectively for what pertains to the mind system and to the body system. B and C are not in direct relation but only in indirect relation. A B is

different from A C, and the relation between B and C is that both are implied in A. Thus there is interaction between B and C without causal relation. For, let us suppose that the initiation of a change is in B, the change is a change of A, but A is also C, and therefore there is a change in C consequent on the change in B. It is the nature of the consequence which is all-important in my theory. A is always changing, change being of the essence of activity, and the change of A is a change in system B, and a change in system C. The relation of B and C to one another is mutual adaptation. A profound change in B may necessitate very slight adaptation in C, may conceivably necessitate no adaptation at all, and then the changes in B and C are quite disproportionate. It is this that differentiates my view from parallelism. The change in the mind is never commensurate with the change in the body, and there is no one-to-one correspondence which would make it possible for even an infinite intelligence to read the one in the other.

Let me try and apply the formula. Life, I have said, is enduring and efficient, and I have shown that these characters are antithetical. I suppose, then, life to exist as an undifferentiated unity. If I am challenged to justify this supposal by any actual experience, I have, of course, to acknowledge that there is no such experience. I am presenting a scheme of the genesis of experience, not a temporal history of it. There is no experience of life save as already differentiated into body and mind. This is not a difficulty peculiar to philosophy, it is an inherent difficulty of all scientific explanation. How, for example, can I schematize what light is without the notion of latent energy, yet, so far as experience is concerned, latent energy is non-existent energy? I conceive life, then, as first an undifferentiated unity which to realize itself, to become actual, to be living action, must differentiate itself. This differentiation is a dichotomy, a separation into two individual systems, the order of which is governed by principles which are opposite and contradictory, but at the same time the systems are complementary. One principle is realized in the mind, the

other in the body. One forms an enduring agent preserving past and projecting future action, and the other an efficient instrument inserted into the whole system of interacting forces within which it is operative. Freedom is essential to the agent, mechanical necessity to the instrument. Here we must be on our guard lest our metaphors defeat us. Agent and instrument are metaphors which almost directly suggest the distinction between a machine and its function, and we cannot apply this distinction to the relation of mind and body. Between life and function there exists no distinction. The body is not like a motor car which a man leaves in his garage until he has need of it. Living action progresses with the continuous modification of mind and body. The action is neither physical nor psychical nor partly physical, partly psychical, it is psycho-physical. No physical influence affects the mind save through the body, and no psychical influence passes from the mind save through the body. All and every experience modifies both mind and body, but the modification is not a mechanical addition to something which but for the addition remains identical with what it was before. However subtle and imperceptible the change may be which new experience effects on the mind, it is the whole mind which is changed. And however slight the demand on the body a new experience makes, even though the action called for may appear a mere repetition of countless previous similar actions, a change is effected in the whole disposition of the co-ordinated mechanisms which comprise the body. We know that the organs of the body and the constituent elements of the organs atrophy with disuse and grow with use. A continuity of change in mind and body is a condition of life.

Here I may offer a remark on the bearing of this theory on the question of survival. It is not strictly relevant, yet to many the predominant interest of the whole problem of the interaction of mind and body is the light it throws on it. I see nothing irrational in the notion of a survival of personal experience after death. The credibility of it, as matter of fact, must depend on ordinary scientific evidence,

and with this my theory has nothing to do. The only question it is concerned with is how far the system I call mind is conceivable when the system I call body is practically destroyed. There are two types of religious dogma; one is the natural immortality of the soul, the other is the resurrection of the body. I do not propose to discuss or compare them in regard to their conceivability, for with the first my present argument is not concerned. I will only point out, therefore, that so far as the view of the relation of mind and body which I have tried to set forth is concerned, some embodiment is essential to every presentation of mind as image of a concrete person, or as general idea or concept of an actual individual. If, then, we believe that the departed soul can or does return now and here, or that it may or will return hereafter, or that it moves to a new sphere and lives in other conditions, the pertinent questions in regard to any such belief are those which St. Paul set himself to answer: "How are the dead raised up? And with what body do they come?" A soul without a body would be a non-receptive, non-active mind, and that is only not a contradiction in terms because there are no terms to contradict.

Mind and body are then, in my view, two disparate but not separate nor separable systems or orders. They are the necessary condition of the realization of life in action. They arise and undergo modification continuously in the progress of living action. They interact continuously by mutual adaptation. They are never in direct causal relation, in the sense in which that relation holds in an energetical system, but they have a common source and co-operate in a common end.

CHAPTER IX

THE MECHANISM OF PSYCHO-PHYSICAL ACTIVITY

Une sensation renferme telle ou telle idée : donc nous avons ces idées aussitôt que nous avons cette sensation. Voilà une conclusion que les mauvais métaphysiciens ne manquent jamais de tirer.—CONDILLAC, *Traité des Sensations*, Bk. I. chap. ii. sect. 8.

WHEN Hume described the constituent elements of experience as impressions and ideas, and when Kant described the fundamental matter distinct from the form of experience as the manifold of sense, they referred, not to what we call perceptions, but to something simpler and more elementary, to what we call sensations. The pure empiricist, that is, one who acknowledges experience as the only criterion of reality, seems to find in sensations not only something indisputable, simple and elementary, but also something which in a singularly precise way corresponds to the functions of the constituent elements of the neural structures of the body. In fact, when we begin our study of the mind by making an inventory and descriptive classification of the sensations we seem to be following a natural course, directly suggested and borne out by the science of the structure and function of the nervous system. Up to a certain point everything has seemed to confirm this view. It has always been recognized, and the recognition is the starting-point of a science of psychology, that sensation is *sui generis*. It is impossible to identify it with physical structure, with vibration, material or ethereal, or with any kind of mechanical action, yet there has seemed to be in fact a relation between the two not only in their simple origin but at every stage of their growing complexity. This parallelism of

psychical and physical has frequently been taken as primary fact and as affording evidence of an undiscovered, if not an undiscoverable, identity. The parallelism takes the form of the simple affirmation that as invariable fact whenever there is a psychical event, let us say a sensation, there is always concomitant with it a physical event, the stimulation of a neural structure. The relation between the two events is not causal in the meaning of physical science for there is no common measure. Parallelism as a theory led directly to the concept of the epiphenomenon. This concept was formed in order to give expression to the fact that the parallelism is one-sided, heavily weighted as it were on the side of the physical, for the psychical is not concomitant with the whole of the neurological, much less with the whole of the physical. Sensation came to be regarded, therefore, as an epiphenomenon, a concomitant of certain special neural conditions on which conditions, however, it did not react. Sensation in this view is conditioned by neural structure, and it is always the conditionate, never *vice versa*. This long-accepted and comparatively simple idea of the relation of sensation to nerve structure has been completely upset by the recent great expansion of the science of neurology. Recent research, so far as it throws light on the fact of sensation, proves that sensation is not simple and ultimate or, in any definitely technical meaning, specific ; that it rarely if ever enters into conscious experience as a specific response to a definite stimulus ; that its simple character does not depend on the elements we are able to dissociate ; and that the quality of sensation taken as a response to a definite stimulus is neither in intensity nor in extensity graduated by the stimulus. Let us first, however, examine a little more closely the old concept of the simplicity and elementary character of sensation in order to see why it has needed reform.

Psychical life is a duration, but it seems constituted of a succession of sense impressions. These are not easy to isolate, but the difficulty is not that of distinguishing them, it is rather the practical difficulty of experiencing them separately.

In the first place, they are so rapid in their succession as to appear continuous, and in the second place the sensations of the different senses are simultaneous, so that at any moment of experience a vast number of interconnected sensations of different quality are mingled together. Each sensation seems, however, to have its occasion in a sense impression, and each sense impression its occasion in the physical stimulus of a sense-organ; and although the mechanism, enabling these impressions to be associated together and to give rise to the perceptions or conceptions which constitute knowledge, is extremely complex, the inference seems plain that, reduced to its utmost simplicity, the fundamental scheme of knowledge is that physical activities stimulate sensitive surfaces and are translated into psychical qualities out of which our perception of external reality is constructed. This external reality may be a fiction or construction of the mind, it may be no more than a sensation plus a possibility of sensations, but it is always conceived as more than the actual sensation. The idea of the possibility of a passage from sensation to knowledge depends on the implication that there is a constant relation between stimulus and sensation. It is not necessarily causal, but the psychical quality must be thought of as in some correlation with the physical reality. All the older psychology was built on this presupposition, and one of the most important movements in the history of philosophy is the attempt to show that knowledge of every kind is an association of simple sensations.

Idealists and realists alike have been in agreement in accepting as a fundamental fact that a sensation, taken in its simplicity and apart from any causal inference, is ultimate. Their controversy arose over the causal inference, the realists insisting that the actual physical objects were revealed by sensations, these being the psychical equivalent of sensible qualities in the objects; the idealists who followed Berkeley declaring the sensations themselves the objects of perception, denying any ground of inference to an independent reality, and accounting for objectivity by a theory of ideal substance. The sceptics following

Hume denied the possibility of validifying any inference whatever, substantial or causal. Throughout the whole of this controversy the unassailability of the sensation as the ultimate constituent of experience was accepted almost as an axiom. It not only was never called in question, but it appeared unquestionable, and the whole controversy was as to the sufficiency or insufficiency of sensations of themselves to constitute experience. The main difficulty was to account for the idea of necessary connexion, which seemed as fundamental in experience as the constituents themselves, for even the sceptic must produce a theory of the appearance of necessity in justification of his denial of the fact.

Nineteenth-century idealism was not based on denial of the fundamental reality of sensation, but on the affirmation that the relations or connexions of sensations are of equal objectivity, and as constitutive of experience, as the sensations themselves. This principle first found full expression in the concept of the *a priori* synthesis. The later controversy has been between those who have held that relations are as foundational and as constitutive of experience as the matter of sense, and those who have held that relations, however necessary to and presupposed in experience, are purely external and do not affect the independent existence of the sensible matter.

The most definite recognition of the objectivity of sensations in the full scientific meaning is the well-known *Sensationstheorie* of the physicist Ernst Mach (1834–1916). Sensations, being the ultimate constituents of experience, are in his view the basis on which physical science itself must rest. Everything physical in so far as it is knowable is translatable into terms of sensation. Inasmuch, however, as sensations are purely psychical, and inasmuch as the psychical does not enter into the system of direct causal action and compensated reaction of physics, he was obliged to adopt the theory of parallelism. By adopting the hypothesis of parallelism sensations become amenable to scientific treatment, for although they cannot themselves be directly measured they are now correlated with a

physical series which can be. Sensations can indeed be classified and their laws determined, also they are representable in idea and the subject-matter of intercourse between mind and mind. Yet they are a peculiar class of phenomena inasmuch as they are themselves immediate experience and also the type or form to which all knowledge is reducible. They cannot be brought within the physical system because their relation to physical reality is not causal or consequential in the scientific meaning of an equivalence of action and reaction. They are, in fact, a parallel series: they are not an aspect of the physical nor in any way identical with the physical, but ideal existences. They constitute the mind as an ability to know, and are the form to which all knowledge is reduced. As matter of fact, however, there are three series, viz. (1) the physical actions and reactions, (2) the physiological responses, and (3) the psychical responses or sensations. The first and second belong to the physical system, the third does not.

The science of sensations in this view is therefore not psychology in the ordinary acceptance of the term, that is to say, it is neither introspective nor subjective. It treats sensations as equally objective with the facts of physical science, and its main interest is to determine the laws by which they have come to reveal to the mind the physical universe.

An interesting illustration of Mach's problem and method is given in the careful drawing he made, reproduced in the *Sensationstheorie*, of the actual visual imagery accompanying his conscious perception when lying in bed. He drew accurately the perspective of the objects and the actual proportion of everything which came within his field of vision. The extraordinary disproportion between the actual sense impressions on the retina and his perceptions, also the distortion in perspective, which to all appearance must be automatically corrected, is strikingly demonstrated.

The whole scheme of a science of sensations is based on the assumption that the conditions of a sensation are invariable. The quality of the sensation is not deducible

from its conditions, but the existence of the sensation is invariably accompanied by a physical change in material structures. For example, let the sensation be a vivid patch of red. I may attribute it to a direct image of a visible object, or to an after-image when my eyes are closed and there is therefore no object, but in each case the sensation is concomitant with a specific change in certain nerve structures. The sensation and the change in nerve tissue are the two parallel existences, and each seems reducible to an original elementary simplicity and each concomitantly develops an ever-growing complexity. Simple strains in a structureless ether develop the complexity of mind. Such, in brief, is Mach's theory.

The scheme is scientific both in its conception and in its method, and the criticism of philosophy upon it is that, however useful it may prove in practice, it can never give what it is intended to give, and what it professes to give,—a theory of knowledge and existence, a scientific philosophy. It cannot do so because the simplicity which is its goal is only reached by abstraction, that is by subtracting more and ever more from the richness and diversity of experience. The fascination of the idea that the simple elements we obtain by elaborate and arbitrary methods of abstraction are more real, more abiding and more original than the living whole from which we have abstracted them is irresistible, however irrational. It seems, for example, almost absurd to question the fact that the earliest forms of life on our planet were of extreme simplicity and that the more complex forms have evolved from them. Yet the evidence for it, so far as actual fact is concerned, is purely negative,—the *absence* of fossil remains,—and the theoretical problem is more and not less complicated by the hypothesis. Yet the opposite assumption even shocks us by its *unscientific* character. It is not evidence, therefore, in the empirical meaning, but a reasoning which seems inherent in our nature, that is at the root of our conviction. We have but to recollect the astonishment caused in our own generation by the discovery of the evidence of a pre-historic, yet essentially modern, civilization in Crete, and, even more

amazing, the increasing evidence that neolithic man possessed the arts of agriculture and engaged in oversea trade. It is precisely the same inherent reasoning which makes us think that the infant mind must consist of extremely simple associations, and that the adult mind is gradually built up out of infantile trials and errors. In the case of the simplicity of sensations and their parallelism with a corresponding simplicity of physiological reaction, however, it is not by general philosophical criticism of general scientific method that it stands condemned; the theory fails to accord with fact in the ordinary sense in which appeal to fact is made. The description which the theory of parallelism presupposes proves false. It is proved false by the discovery of the function of the cerebral cortex in sensation. Let us first, however, examine more closely the theory of parallelism itself.

The sensation and the physiological condition concomitant with it are conceived by the theory of parallelism as each in itself ultimately of extreme simplicity. Each is the constituent element of a series of events. The two series are unalterable in their special nature and therefore not interchangeable, but each series within its own procession is able to give rise to endless variety, diversity and complexity by addition, coalescence, commingling and such-like mechanical relations. An analysis of experience is supposed to end in a quality which has to be accepted as simple existence, the sensation. It is accompanied by definite quantitative change in a special physiological structure. The original idea of a parallelism was metaphysical. It was first definitely formulated by Leibniz as a hypothesis to explain the relation of the mind to the body. He suggested that mind and body might be related to one another as two entirely independent but perfectly regulated clocks, the workmanship of a divine artificer. Each would depend on its own principle and be independent of the other, but each at every moment would exactly accord with the other. Modern psychologists faced with the difficulty of bringing the science of mind within the energetical system of physical science availed themselves of this idea.

It seemed at least to be innocent and non-committal. Its acceptance might be half-hearted and unsatisfactory, but as a provisional hypothesis it at least appeared to offer a principle by which the new science of mind could get to work. For anything to be scientifically treated, the first condition is that it be measurable, and the hypothesis seemed to offer a very effective substitute for direct measurement. It appeared, moreover, to be justified by the pragmatic test of success in working, and psychological research generally tended more and more to confirm it. A great advance was made when Johannes Müller (1801–1858) formulated the theory of the specific energy of the nerves; and when later Weber (1795–1878), and following him Fechner (1801–1887), announced the discovery of a definite psycho-physical law, it seemed that the foundation of a descriptive science of mind on the basis of complete parallelism was assured. Even when the promise of progress along this line was disappointed, the basis of parallelism seemed to be continually confirmed by new discovery. Following the formulation of specific energy came the analysis of skin sensations into the four completely distinct classes of heat, cold, touch and pain, each class served by specific nerves and distinguishable by the sensitive spots. It was found possible by careful survey to map out the exact distribution of these spots on the whole surface of the body, and it seemed to indicate that we had found the ultimate elements of neurological discrimination on the one hand and of qualitative psychical response on the other.

Side by side with this advance in the discrimination of nerve-endings has gone an increasing discovery of the localization of function in the central nerve masses of the brain and spinal cord. First, the parts of the cortex which are concerned with the sensations of the special senses—vision, hearing, taste and smell—were localized; then it was found possible to map out a motor area and detect the exact spots at which the control of the voluntary muscles which move the limbs, and those which bring about the complicated movements of articulate speech, are situated. Everything seemed to tend to the conclusion that on each

side — the physiological and the psychological — there is ultimate elementary simplicity, and that the complexity of the concrete mind-body is purely mechanical. The fact that the two orders, psychical and physical, could not be reduced to one, seemed to be adequately met, or at least its disconcerting obstinacy to be overcome, by the hypothesis of parallelism.

It was indeed surprisingly simple. An organ like the great brain or cerebral cortex, containing thousands of millions of individual cells each with a specific function, could not be easy to lay bare in its working or to follow in the intricacy of its paths, but at least it seemed clear that its work could be no other than that of associating the sensations and so providing the condition of judgment and general mental process.

Recent discoveries have completely disappointed this promise, and altered the whole aspect of the problem. They begin with the discovery by Dr. Head, in a famous experiment already referred to, that there are two systems of sensitivity, completely distinguishable from one another, named by him the epicritic and the protopathic. To the first belong the skin sensations of the four classes of sensitive spots. The other, the protopathic, is an apparently older, more diffused kind of sensation, but, what is important, it is quite distinct in the nature of the response it gives and the system to which these responses belong. The discovery, interesting enough in itself, might yet have remained a mere detail of physiological and psychological analysis had not its discoverer at once grasped its significance and followed it as a clue to guide him in his further researches, more especially with regard to the function of the cerebral cortex. Let me first, however, try and indicate without entering into anatomical and physiological details the significance of the discovery for theory of knowledge. I will take an illustration. The finger-tips are extremely sensitive and highly discriminative. The slightest contact with an object is enough to obtain a psychical response conveying the most delicate distinctions in the physical stimuli of temperature, surface quality, pressure, weight, etc., and also a high degree of sensitive-

ness to pain. When I shake hands with a friend my fingers not only discriminate temperature, surface, pressure, etc., of the physical object, but enable me to respond in thought and feeling to all the modifications introduced by my friend into his handshake. In fact, my handshake may become a language. In all this I have an experience which, however hopelessly complicated the task may appear, offers no theoretical difficulty to an ultimate resolution on analysis into simple elementary sensations responding to simple elementary stimuli. But now, suppose the hand I touch is that of the lady with whom I am in love—will any analysis into epicritical sensations of pain, touch, heat and cold, describe, much less exhaust, the response? I am not thinking of any emotions which may have other occasions, but purely and simply of the response to the hand-touch. There is a difference of kind and not of degree in the sensation itself. The lady's hand is not softer or warmer or more delicate to my touch, judged by any physical criterion, nor need I suppose any intention to impart language on her part, nor yet is the quality of the sensation due to judgment being warped by imagination or emotion,—it is a protopathic response. The significant thing, however, and that to which I now wish to direct special attention, is that this difference cannot be accounted for by saying that in one case the sensation evokes emotions, in the other not. It may be true as a first description: it is useless as an explanation, for it explains nothing. No analysis of pure sensations as simple accompaniment of physiological reactions to physical stimuli will discover the difference which makes some evoke specific emotions, some not. The emotions, in fact, are not conditioned by the sensations, they are indifferent to them; they are conditioned by aesthetic imagery. Clearly something must intervene between pure sensation and emotion, and it must be psychical. It intervenes not only between sensation and emotion, but also between sensation and responsive muscular action. An image is created. This essential, pivotal, fact in the working of the psycho-physical mechanism is purely mental however it purport to

represent nature and matter. It is the aesthetic activity, and if we must assign it an instrument in the organism we must localize it in the cerebral cortex, for when that is injured the functioning of the image-producing activity is impaired; but it cannot be identical with the pure receptivity of the mind in regard to sensations.

It is necessary to suppose this function, and when we consider what it implies we see that it must be wholly distinct from the sensory function itself. It cannot, that is to say, be only integration, to however high a degree of perfection such integration be carried, by means of simple association or any other mechanical mental process. It cannot be so, because knowledge is not an association of sensations but an interpretation of them. Were we able to study exhaustively the sensitive spots and to manipulate them in endless varieties of combination, playing on them as we strike chords on the keyboard of the pianoforte, we could not thereby construct knowledge; not because there is no common factor between psychical quality and physical quantity, but because knowledge is interpretation. It supposes a factor which fits the sensation into an imaginative system. If the cerebral cortex be, as there is every reason to believe it is, the organ of intellect in its highest specialization and the means by which the logical processes of thought are carried out, this is the function *par excellence* we must assign to its response to sensation. Aesthetic activity conditions logical activity,—concepts depend on images. Anatomical and physiological research has come to confirm this view.

If the cerebral cortex generated the mind by exercising the passive, mechanical, responsive, associative and integrative functions which used to be assigned to it, we should expect that lesions of the cortex would be accompanied by definite quantitative effects on the sensitive spots. We should expect that according to the extent and affected area of the injury or destruction of tissue in the cortex, there would be interruption in the functioning of such of the sensitive spots as were in direct communication with it. For every sensitive spot is in communication with the

cortex, and on that communication we suppose its particular psychical effect in consciousness to depend as well as its association and integration. It would be natural to suppose, therefore, that a definite diminution of sensation would follow injury or destruction of the cortex, corresponding to the extent of the injury, and due to throwing out of action a definite number or a particular class, or a special area, of sensitive spots. Nothing remotely approaching such a condition is found to take place. When the injury is confined to the cerebral cortex and other parts of the nervous system are unimpaired, what we have is not loss of sensation but disturbance of the normal interpretation. First of all the power of accurate localization is lost, then the power to judge intervals of time, and then the power to estimate comparative weights and identify similar stimuli. But what is more curious and instructive still is that older, it may be pre-human, instinctive reactions and reflexes come into play. This cannot but suggest that the means by which these older systems have been superseded is a power which has been able to hold them repressed or inhibited without being destroyed, for they begin to function again when the control is weakened or the inhibition removed.[1]

The physiological and biological problem is to determine the function of the cerebral cortex. The psychological problem is to discover the psychical import of that function and its place in the mental life. It is on the relatedness of these problems I desire to concentrate attention. The physiologists have demonstrated that the sensitiveness of the organism, in whole or in part, is unaffected by injuries to the cerebral cortex, and further that the specific psychical apport of the separate sensitive spots is unaffected by the activity which the cerebral cortex exercises in response to it. It seems to me that this is precisely what a study of the mental life itself should lead us to expect. The basis of knowledge, its primary and essential condition, that on which all intellectual process depends, is imagery. Images

[1] See Henry Head, "Sensation and the Cerebral Cortex," *Brain*, vol. xli. pt. 2, 1918.

are not sensations nor composed of sensations, though sensations are the occasion of their production. We have only to consider the two activities, perception and memory, to see how wholly dependent our mental life is on imagery. The mental life consists in perception and memory, and these active processes are concerned only with images. Thus the pin-prick gives me a sensation of pain which I *feel*. What I *perceive* is not the pain I feel but the pin-prick, and that is a sense-image. What I *remember* is the pin-prick, and that is a memory-image. If I seem to remember the pain it is not really the pain I felt which is reproduced but an image, otherwise the memory would itself be sensation. Sensations are not images, nor are they in any intelligible meaning constituents or elements or components of images. Even if we adopt the standpoint of the associationist and resolve the image, in this case the pin-prick, into an association of sensations, visual, tactile, and painful, even then over and above the sensations, simultaneous or successive, and their association, we have to postulate an activity which selects them and which, when it has selected them, fashions them into a permanent shape which makes it possible to present them, then and thenceforward, as one and identical. It is impossible to reject the fact that in some form image-creation is at the basis of intellectual life. The image, not the sensation, is the pivotal fact on which the whole structure of intellectual knowledge rests. In this highly significant fact we may find the clue to the unravelling of some of the most perplexing riddles of our emotional and intellectual nature.

Every human being is, I suppose, to some degree,—doubtless there is difference in the degree,—at times the unwilling prey of sensuous imagery, and it gives rise to a mental conflict. It seems to us at such times that we are slaves to ruthless impulsive emotions which compel the indulgence of imagery even though at the same time we are fully conscious of the loathing with which it fills us. Literature teems with examples of what it is difficult to express adequately in technical scientific terms.

Often enough it is the tragedy of saintly lives. One of the finest artistic expressions of it is Robert Louis Stevenson's *Strange Case of Dr. Jekyll and Mr. Hyde.* It is the burden of a great part of the writings of St. Paul, and it looms largely in the graphic description of the spiritual conflict which issues in that heart-cry, "Oh, wretched man that I am, who shall deliver me from the body of this death?" The psychical fact which appears to me to lie at the basis of this mental conflict is the dependence of our emotions on imagery for their expression. It is true of all our emotions,—fear, anger and the rest, and not only of the sexual emotions, although it is in sexual emotion that this dependence is most pronounced. Why should this give rise to conflict? Imagery is purely intellectual, by which I mean that the creating of images is a distinct mode of intellectual activity: the image is a product of intellectual activity. But the intellect is also on the motor side directly in control of the voluntary muscular system. It stands, therefore, eminently for what we call the will; meaning thereby not blind impulse, but the power to direct and control. Our emotions, on the other hand, belong to the affective side of our nature and control the glandular system. They bring about glandular activity and find their satisfaction in glandular discharge, but for the power to exercise this activity they are absolutely dependent on imagery. Here, then, are the controlling forces,—emotions compelling the intellect to find for them expression in imagery, the intellect unable to resist the compelling force of the emotion, yielding easily to the demand of the emotion for expression, but resisting the capture of the voluntary muscular system over which the emotion has no direct control. Let us look at it a little more closely and try to illustrate it from facts of common experience. The point for which I am contending is the recognition of the image as distinct from the sensation. The image is the product of an aesthetic activity and not of a passive sensibility.

In the first place, it is entirely in accord with the well-known theory of dream interpretation associated with the researches of Freud and Jung and their followers.

According to this theory the dream is caused by active "wishes" or impulses or cravings repressed in the unconscious mind, which avail themselves of the relaxation of censorship during sleep to emerge into consciousness. They can only express themselves by clothing themselves in imagery, and for this purpose they avail themselves of the images which have formed some recent experience and are therefore ready to hand. Hence the phantasmagory, distortion and contraction of the dream-consciousness. What is significant to me in this theory is the recognition that the only outlet of an impulse to expression is sensuous imagery. The dream is a striking instance of it, but it is just as true of waking experience. If there are no images there is no perceptual world, for images are not conglomerated sensations, but *sui generis* products of an aesthetic activity. Especially instructive are dreams which are primarily caused by physical discomfort and which end in glandular or valvular discharge, cases in which the impulse is not a repressed wish but an ordinarily controlled natural function. Here, if anywhere, we should expect that an impulse, active during the unconsciousness of sleep, would of itself bring about the required relieving action, yet it seems unable to do this until it can draw the aesthetic faculty of the mind into activity.

Consider now an ordinary emotion,—fear, for example. In its terrifying form it is a rare and occasional experience, but in the milder form of anxiety it enters into the daily ordinary life of every one, differing greatly, indeed, according to temperament. In its way it illustrates admirably the conflict, though on a lower and unimportant plane. Anxiety has only one way of expressing itself, and that is compelling the image-forming activity. We resist, but are helpless. A child has not returned home at its wonted hour, or a friend lies ill. We may know perfectly well, and may be able to think of, numberless reasons which would account for the one or the other, and we know that, as a probability, disaster as the cause of the child's absence, or death as the end of the friend's illness, is negligible, yet if anxiety overcomes us we picture street accidents, portray vividly all kinds of

dangers, or we think of death and follow out the imagery to the funeral scenes and mourning. We may be all the time conscious that our fears are idle and our forebodings foolish. We may be vexed with ourselves and try to disperse the images. It is useless, we are helpless. But no sooner is the anxiety relieved than all this imagery disappears in oblivion. So complete is the oblivion that when, as must in the ordinary nature of chances happen to some one sometimes, a real disaster is simultaneous with an anxiety and the image in which it had found expression, it seems supernatural and an instance of occult, or at least abnormal, mind-activity.

These facts, when we give full attention to them, seem to make it clear, not only that there is in us as part of our human nature a distinct aesthetic or image-forming activity, but that it is the fundamental activity, the basis of perception and the condition of action. This is not the ordinary view. Imagination or fancy is a mental power universally recognized, but also universally rejected as having no claim to be constitutive of the real world of practical life. It stands as the very name for unreality. It seems to us to weave airy forms which dissolve and vanish at the touch of real life. We know that the objects we perceive as well as the objects we imagine are images. We can give no other meaning to our words. The glorious crimson clouds in a sunset sky could not be presented to the mind as identical with the tiny globules of water which surround us as a gloomy chilly fog when we are within them, had the mind no power to form images. It is images we perceive, interpret them how we will. Yet despite this fact, we are firmly convinced that a sharp and absolute difference in kind separates into two classes the images we perceive and the images we fancy—separates, therefore, the activity of perceiving from the activity of imagining. It seems the height of paradox to declare that the things we perceive and the things we fancy alike receive their form and substance from one and the same creative activity of the mind. I want to show that when we start with the concept of reality as life and consciousness and not as something or

other on which these somehow depend; when we make the task of philosophy to follow the life of the mind in its development or unfolding and thus present it as history; then it is no longer a paradox, and the appearance of paradox is itself explained as an end at which the life activity has aimed and which it has achieved.

There is, however, one condition to which any sound metaphysics must submit, failing which it can never bring conviction to the human mind. It must respect the concept of the objectivity of the real. If, that is to say, philosophy begin by showing that the ordinary notion of what constitutes the objectivity of nature is irrational, it must replace that notion with one that is rational. We cannot reject the ordinary notion and propose to do without absolute objectivity at all. Continually throughout the history of human thought notions which have seemed fundamental, rooted in the nature of things, have been undermined and replaced with other notions, but they have always been replaced. The concept of physical reality has undergone continual change, but throughout all the revolutions in our ideas, objectivity in the absolute sense has not been in question. It is not by dialectical arguments like those of Zeno and Heracleitus that men have become convinced that the earth is not at rest, that the atmosphere has weight, that mass is a function of velocity, that particles are charges of electricity. At every stage of the evolution of ideas, to be effective a new view has had to replace the old and the new view has had to be more satisfactory in its objective aspect.

Precisely the same is true with regard to the concept of perceptual reality. The belief of mankind that perceptual images are objectively real and fanciful images subjectively real, that the one are caused by physical objects, the other by a riot of the faculty we call imagination, seems grounded in the nature of things and unquestionable. No dialectical exposition of the baselessness or even absurdity of this interpretation of experience will bring conviction, which simply denies the objective distinction of the perceptual image, or which places it objectively on

the same plane as the fanciful image. Philosophy is in the first place the aesthetical problem,—in what does the reality of the perceptual image, the unreality of the fanciful image, consist? And in the second place the logical problem,—in what does the objectivity of knowledge and truth, the subjectivity of opinion and error, consist?

The second of these problems has been recognized as the peculiar province of philosophy from earliest times; the first has been much later in gaining recognition and is even yet hardly acknowledged. Yet the moment our reflexion is directed on this aesthetic problem it becomes clear that the failure of science to find any ground in experience for the fundamental distinction on which it rests, the aesthetic distinction of perceptual and fanciful images, is absolute. Consider the ultra-scientific theory of sensations to which I have referred. Let us challenge it, not generally, but on a particular point most favourable to it. There are three series of actual objective events,—a series of physical events, a series of physiological events, and a series of psychical events. The theory is that the sensations or psychical series are invariably concomitant with the physiological series, but only when that physiological series is in direct and immediate relation to the physical series does the series of sensations become a series of perceptual images. How, then, are we to explain the phenomenon of the after-image? I am lying in bed and my eyes are directed on the pendent electric lamp. I switch off the light and the room is completely dark. In a few moments I have the vivid sensation of an intensely brilliant green glow passing, on its sharply defined outline, into orange red, projected where I imagine wall or ceiling to be. After a few seconds it passes, at first slowly, then with an increased acceleration, to the right. Why do I say that the image of the electric lamp before I switched the light off is resolvable into three concomitant series and the after-image into only two? By assuming the physical series in the one case and its absence in the other I can offer myself some more or less plausible hypothesis, no doubt, but confining myself to the acknowledged data of the theory of sensations I have and can

have no possible explanation. At any rate, if there be one it is yet to be produced.

It seems to me, then, that sensations, however fundamental, essential and important, play a comparatively subordinate role in the mental life. No construction of them or development of them can constitute the concrete reality of life. The first expression of complete mind is the image not the sensation, and the first self-sufficing form of activity is the imagination. When as yet there is no image, there is nothing. Abstract sensations cannot be welded together to form an image. Let me then outline the way in which the life of the mind appears to me to shape itself and accord with the organization of the body for action.

When we try to present the life of the mind in its full reality to the mind itself, we are met with a difficulty which is familiar enough in physical science and which science has had to find the means of surmounting. This difficulty is that only a fragment of our full life comes to expression in consciousness, and that knowledge in its positive meaning is confined to that fragment. If then we would have a complete knowledge of mind we must transcend consciousness to the extent of forming a conception of unconscious mental existence. In physical science we have the same difficulty. What appears is not self-explanatory, and we have therefore to introduce the concept of energy, an energy latent when it is not kinetic. In precisely the same way we must introduce the concept of energy if we would comprehend the full life of mind. Here, however, there is an important, it seems to me an all-important, difference. We are not without knowledge of mind-energy, it is only the form of the knowledge which offers a difficulty. In regard to psychical reality as compared with physical reality we are in a privileged position. We know our life in living it. We experience the inward force and push as well as the outward expression. In fact had we not this intuition of mind-energy it is difficult to imagine that we could ever have formed the concept of physical energy. Our difficulty in the case of mind is to find a concept which will express the existence of our activity before it finds expression.

Mind is pure activity, and activity is only known in its expression. An activity is what it does, and what it does expresses what it is. We experience this activity in two forms, first as emotion, second as action. Both forms seek expression, depend in fact on expression, and find expression in the image. Until there is imagery there is no mental expression of any kind. But while one form is definitely shaping itself in action, the other form is indirectly concerned with action. Herein it seems to me consists the difference between the perceptual and the fanciful image; while the one is only indirectly and remotely connected with action, the other is intimately concerned in, and called forth by, the forming action. And here physiology and biology come to our aid. Physiology shows that the cerebral cortex is mainly concerned in the shaping, controlling and directing our voluntary actions, and to this purpose integrating a glandular system stimulated by a protopathic sensibility and a muscular system stimulated by an epicritic sensibility. Biology shows the antiquity of the protopathic system with its psychical accompaniment of emotion and instinctive action, and the evolution of the epicritical system in the rise and development of the new brain with its psychical accompaniment of voluntary self-conscious action, culminating in the intellectual activity in man. However this may be, my main contention is that in the nature of the activity which finds expression in emotion on the one hand, and in purposive action on the other, we have the true distinction between the fanciful and the perceptual image.

To sum up, then, the theory of sensations supposes that the mind consists of ultimate simple qualities forming a series of successive and simultaneous psychical existents; that this series is concomitant with a series of physiological changes in specific nerve structures; that these physiological changes are primarily induced by the stimulus of movements, material or ethereal, in the physical universe. The sensations are held to be states of mind which are related together by laws of association analogous to the attractions and repulsions of physics. Criticism of this theory reveals its utter inadequacy to account for the primary fact of mental

life—the image. Perception and memory, the distinctive activities of the mind, depend on imagery. There are two kinds of images,—perceptual images which represent the objective reality of the world, and fanciful images which represent the ideal independence of the mind of that objective reality. The difference between perceptual and fanciful images, according to the theory of sensations, is that the physiological series of neural changes which accompanies the sensations composing the images in one case is, in the other is not, concomitant with a series of external physical stimuli. The criticism of this theory shows that there is nothing in the sensation which reveals whether it is or is not concomitant with anything else. When we reject the view that mind is conditioned by an independent reality on which it depends, and conceive mind as itself the reality of an activity of which all existence is a mode, the concept of activity itself involves a twofold mode of existence, one latent and potential, the other actual and expressed. Mind is an inward push expressing itself in outward action. The latent activity of the mind is called into expression by the sensitivity of the body. Bodily activity is glandular and muscular. Mental activity is either emotional and sensory or voluntary and motor. Both forms are dependent on imagery for expression. The images are distinguished by their function. Emotion is connected with a system of deep protopathic sensitivity and only indirectly concerned with action. Will is intellectual and directly concerned with action. Will is connected with a superficial, sharply differentiated, epicritical sensitivity. Its expression is called forth by the continually present need of shaping the progressing action, and this gives its objective character to the perceptual image. The role of sensation is to form a kind of sentry outpost system to the mind. Sensations have no apport. They evoke images, but the images are not the sensations plus associated reminiscences of sensations. An image is the work of the mind *sui generis*. This essential, characteristic, manifestation of mind is the aesthetic activity. The mind expresses its inner impulses and latent force by creating images.

CHAPTER X

MONADIC INTERCOURSE

Don Quixote affirmed the two flocks of sheep were armies with such assurance that Sancho actually believed it, and said to his master, "And pray now, good your worship, what must we do?" "What," answered Don Quixote, "but assist and support that side which is weak and discomforted? Thou must know, Sancho, that yonder host that fronts us, is led and commanded by the mighty Emperor Alifanfaron, sovereign of the great island of Trapoban; and that other belongs to his mortal enemy, the King of the Garamanteans, known by the name of Pentapolin with the naked arm, because he always goes to battle with the sleeve of his right arm tucked up."—CERVANTES.

If we accept the view of monadic activity which sees in the image and not in the sensation the essential expression of mind, the problem of the intercourse of monads is completely transformed. The psychological inquiry has brought us back to the metaphysical problem already indicated in the discussion of the windowlessness of the monad,—the problem whether in conceiving the knowledge of the monad to be solipsistic we are not thereby rendering an intercourse between monads inconceivable. When we come to see, however, that intercourse depends not on the power of one monad to impart something of its substance to another, but on its power to evoke aesthetic activity in another, the problem is raised to a new and higher plane.

It is generally admitted that at some stage of its activity the mind forms images; it is almost universally thought that this cannot be either the primitive or the essential function of the mind. Images seem in their very nature to be subjective and personal and supererogatory, their value being proportional to their verisimilitude to some objective

reality to which the mind is passive and on which the image is moulded. Ordinarily this something objective is assumed to be the external world which makes impressions on the mind, but for the analytic psychologist it is perception, and perception has generally been taken to be an association of definite and distinct and specific sensations. On any sensation theory the problem of intercourse is insoluble because there is no way of association by which passively received sensations can become language, and without language (in the wide meaning, and not in the narrow meaning which restricts it to spoken or written words) there is no means of intercourse. On the other hand, when we conceive the mind in the first moment of its expression as an aesthetic activity, that is as an activity which expresses its intuition in imagery as the necessary preliminary of translating living force into outward action, then we see that the image is already language, and the problem of intercourse disappears.

Human beings possess in speech a most highly developed and mobile language. Speech is indeed the distinctive feature of human nature, and has probably more than any other endowment secured to man his present predominant position over other living forms. It is dependent, as we know, on a special development of the cerebral cortex, contrived to give the human will control over a varied and immense range of delicately co-ordinated movements of the muscles of mouth, tongue, larynx, etc. Regarding the problem from the purely psychical side it appears to us that, by whatever chance or concomitance of chances it originated, language essentially depends on a logical, that is, a reasoning process, and that it has developed *pari passu* with the development of our logical power. Nothing else seems necessary so far as mental conditions are concerned. Because man had this reasoning power, no doubt at first feeble, tentative and imperfect, he had, we usually suppose, all the conditions necessary for discovering that there were other minds with whom by agreement as to external signs he could establish communication. The reason why animals do not speak is popularly held to be because

they are more foolish than we are, that is more deficient as compared with us in the power of logical reasoning. We pity them on this account and think of them as our poor dumb friends. Now while undoubtedly spoken and written language is a refinement, dependent on the intellect, a special mode of mental activity, and conditioned by a special neural formation in the Rolandic area of the cerebral cortex, language in its wide meaning as the communication by outward expression of internal intuition is not distinctively human and is not dependent on any reasoning process. It is dependent on mental activity, but on an aesthetic not on a logical activity. It depends on images. Language means not that the sensitivity of one creature is communicated to another, and certainly not that the thought or idea of one person is of itself conveyed to another person, but that the image evoked by one mind can be made to evoke a corresponding image in another mind. The problem of intercourse therefore is clearly connected with the production of an image. What is the nature of this activity? An image is not something which is a common object to two minds. It is wholly private and personal to the mind which creates it. Intercourse therefore must mean that one mind can call forth the activity of another, and the power to do so is intimately connected with the activity which creates the image originally. This interconnexion of the activity of two minds would be impossible were the image only a mosaic formed by the external association within the mind of its passive experience, its data of sense.

Intercourse is impossible and unmeaning if the interrelatedness it implies is conceived on the analogy of the ordinary action and reaction of things in the physical world. Such interaction is not and could not by any kind of transformation become intercourse. If we want an analogy of the intercourse of mind with mind in the physical world, we must seek it, not in the kind of compensation we discover in colliding billiard balls, but in a phenomenon like that of wireless telegraphy. In wireless telegraphy two instruments when tuned to the right pitch will respond to

one another by reciprocal adaptation, the communication between them being established by the Hertzian waves. By the use of the discovery intercourse is established between two operators. If we complete the scheme by including the minds of the two operators we have an illustration of the relatedness of the monads in intercourse. There is no interaction in the scientific meaning. Expression in one mind evokes corresponding expression in the other, but that expression is not common to the two minds, is not shared by them, is not intercommunicated. Whatever form the expression takes in the individual minds, whether it be perceptual or conceptual, aesthetical or logical, it is incommunicable. Only when the two minds are attuned, like the instruments, is there intercourse, and the intercourse depends on the creation by each mind for itself of the appropriate imagery which expresses that accord.

Let me illustrate what I mean by this psychical creation of imagery. Let us take a common instance of animal behaviour below the human, for example the behaviour of the chicken newly hatched. Any one may observe it. Very soon after its release from the egg the chick is running about with its fellows, obeying the cluck of its foster-mother, pecking at objects, swallowing some and rejecting others. It is indifferent to the presence of many living creatures in its environment, but immediately alarmed at the approach of others, running with the rest of its brood to the protection of the hen's covering wings. The creature's behaviour shows that it perceives and remembers. Let us assume that these faculties are part of its heritage ; the important questions I wish to consider are the nature of the mentality, the mode of its working, and the product of the activity, of the creature's mind in so far as it is revealed in its behaviour. By a process of natural reasoning we suppose that the order of the creature's experience must be from without inwards. Its mind seems to be dependent upon the data it receives, and as the creature appears to us to be richly endowed with organs of sense, we conclude that these have an informing function, and that the mind, with its activity of perceiving and

remembering, shapes and forms this matter by a process which is ultimately reducible to association. If any one will take the trouble to reflect on this notion it will immediately appear that it is the notion of an impossible process. Assume whatever inherited powers of perception and memory you like, limit those powers to the direct and simple interpretation of sensations, with their reflex or instinctive responsive actions, and see if you can in any conceivable way construct the experience. Think what the process of reasoning must be which has to combine and integrate the multitudinous sensations, simultaneous and successive, visual, auditory and tactile, pleasant and painful, graduated in intensity, extensity and protensity, into that range of conscious experience which constitutes the first day of life of a chicken. Do not make the mistake of thinking it is simply a time difficulty. Let one day be as a thousand years to the chicken, it is impossible to conceive the means by which it could bring the manifold of sense into the unity of its experience. But this difficulty is nothing to that of accounting for intercourse, even that limited intercourse which we denote by the term gregariousness. Call gregariousness an inherited instinct if you will, you must still form some concept of its mode of working. How with a mind purely passive to the apport of sensation, and active only in association, can you account for the *social* actions of the creature? To call it an instinct and leave its mode of working unexplained, and impossible to explain, is only to make more evident the bankruptcy of the notion that passivity to sensations and activity in logic exhaust the chicken's mind. Can we suppose the logical processes of perceiving and remembering associated sensations powerful enough of themselves to project sensations into the experience of another subject? The important thing is not the length of time nor the complexity of the process but the utter impossibility of conceiving either its initiation or its success. It is evident, of course, under any hypothesis, that a new-born living creature such as a newly hatched chicken brings with it in its physiological organization a latent energy of past racial experience. But this does not

remove the difficulty ; it only throws it back. According to the sensation theory, however far back the organization of experience is projected, experience consists and only can consist of sensation and association, these being its ultimate and only factors. The vice of the whole theory lies in supposing that the mind is essentially a passive endowment, a faculty in a living creature of receiving a revelation of external reality and utilizing the revelation for the advantage of the living organism.

I conceive the mode of mental activity entirely differently. To me it is essentially the translation of internal energy into external expression. It works, therefore, from within outwards, not, as the other theory supposes, from without inwards. Sensations are psychical, but they are not states of mind, and mind does not consist of states. Sensations play a definite part in the life of the mind, but they are not the little bricks out of which the mental life is constructed, the little threads by which the pattern is woven, or the formless stuff to which knowledge can ultimately be reduced. When a new individual living creature, such as a chicken, is born or hatched, its mind does not spring into existence when its active life begins, its mind begins to find expression in living actions. The creation of a chicken's mind out of a chicken's living experience is inconceivable, for its mind is the whole of its past existing as latent energy, that is, as impulse and tendency. This mind seeks expression, and it is dependent for it on imagery. Sensation is the occasion which evokes the imagery not the stuff of which the imagery consists.

All this argument when applied to the experience of a chicken may sound anthropomorphic and absurd, but there is no need to suppose, and the reader is not asked to suppose, that the chicken's mind is finding expression in human imagery. Without being the chicken it is impossible to experience chicken-imagery, but we can know that imagery must be a condition of its mental life. And further, in taking an illustration from animal behaviour we can set aside as irrelevant all theories of the nature of instinctive action. Whether the behaviour of the creature be in-

stinctive or intelligent, it is inexplicable when we endeavour to translate it into, or state it in terms of, sensation theory, because sensations do not give us the essential factor in the behaviour, namely, imagery. A sensation can be sensed, it cannot be perceived or imagined. Only an image can be perceived, memorized, anticipated. An image is a mental product *sui generis*; it does not exist in its own right, but in and for the mind which creates it. In creating the image the mind gives expression to its intuition. But why will not the sensation, or, at least, a group of associated sensations, serve the purpose of the image? Simply because the sensation is in its nature and origin purely subjective and internal, and such it must always remain. In order that there may be action there must be objectivity, and until there is expression there is no objectivity.

The whole controversy concerning the nature of intercourse has been obscured by the tacit ignoring of imagery as a distinct stage in mental activity. Because it has seemed that the image can be no other than the sensations into which it appears to dissolve on analysis, it is assumed that it is no more, and that it is in no way different, and the problem has been to pass from subjective passively-experienced states of the soul to objects identical for all subjects of experience. The classical instance of this in the history of philosophy is the well-known attempt of Thomas Reid to meet the sceptical inquiry of Hume by an appeal to common sense.

The appeal to common sense is based on the fact of human intercourse. The philosophical argument is that such intercourse is impossible unless there exist objects common to the communicating minds. To be common to two minds an object must, so it is argued, be independent of both. When ten men look at the sun there are not ten objects but one object, although there are ten different perceptions of the object. The argument is neither logically sound nor metaphysically necessary, and it soon fell into disrepute, but it is important because it is being revived to-day in the theories of the new realism. As directed against the scepticism of Hume the argument had a certain force

inasmuch as both sides ignored and therefore denied, or rather denied because they failed to discover, any activity of the mind in knowledge. Activity, they held, was purely on the side of the object. To Hume this object was not distinct from the mind, independent of it, and presented to it, for in his theory there was no mind distinct from the object nor object distinct from the mind, the objects of knowledge and the knowing mind simply were the impressions and ideas which constituted experience and gave form to it by association. It is exceedingly difficult to see how intercourse between minds on such a theory is possible, and it seems to follow that if, notwithstanding the logical difficulty, we accept intercourse as fact we do thereby posit the community of a causal object. Why, then, did this dilemma of pure empiricism fail to manifest itself when the appeal was made to common sense? Simply because the same dilemma was inherent in the principle of common sense. It is quite clear that in either hypothesis (the hypothesis that there is or that there is not a common object) the ten men do not see the same sun, and merely to affirm that there is an independent sun, which no one of the ten men can see but which is the sole active cause of the different perceptions of the ten men, explains nothing at all. It merely affirms against empiricism the very belief which empiricism had challenged without offering any alternative explanatory principle. For empiricism and for common sense alike mind is a *tabula rasa* dependent for all it is on the impressions it passively receives, and therefore for both alike the problem is how impressions reveal objects.

The real failure of empiricism is that it identifies sensations with perceptions and consequently ignores completely the specific activity in imagination. Our perceptions are for empiricism complex or associated sensations, and sensations are for the mind " the given " out of which experience is constituted. Contemporary empiricists and realists usually distinguish sensations and sense-data, or, as some philosophers prefer to call them, sensibilia. The difference is not existential, both belong to experience—sensations to the subjective order, sense-data or sensibilia to the objective.

But the mind does not "perceive" sensations, it perceives images, and images are not revealed or disclosed or discerned, they are wholly and completely a product of the mind's own active creation. The mind does not create in perceiving, but unless it had already created an image it would have nothing to perceive. Imagination, in its pure and original meaning, is creative activity, and this creation is the essential nature of mind. When ten men look at the sun, what each perceives is the image which his mind has created to give expression to its intuition. It is this image he thinks of as agreeing or not agreeing with the image in the mind of each of his fellows. It is imagination, in its distinct literal meaning, the power of creating forms and not merely the power of reproducing or of more or less capriciously combining our actual or possible experience, which is the essential and fundamental spiritual activity. It makes intercourse possible, because the mind in finding expression in imagery is creating for itself language. Sensation is private and incommunicable; independent objects are, so far as knowledge is concerned, otiose; the empiricists who appealed to the one and the philosophers of common sense who appealed to the other had no third alternative. Knowledge for them must either be the mind's awareness of its own sensations or the mind's passive response in contemplation to the action of independent objects, and both the alternatives are impossible. Neither party saw that the image which is the true object of perception is *sui generis*. Now it is quite clear that if there is intercourse between mind and mind there is something communicable, and this something cannot be sensation, and it cannot be an object supposed to cause sensation, if the only possible knowledge of that object be the sense impressions it causes. Images are the language by which minds communicate. But here a difficulty will be raised. It will be said that if images are private and owned by the mind which produces them, then they are no more communicable than sensations. This would be so if intercourse implied a currency like the coinage passing from one mind's possession to another's. Quite different in my view is the

communication which language establishes between mind and mind.

The first condition of intercourse is expression. A mind which, as yet, has not expressed its own intuitions, a mind which we can conceive, if we will, as reacting to external influences purely by internal sensations, clearly cannot communicate its experience to another, for it cannot express its experience to itself. Finding expression is self-realization. This is the first characteristic work of the mind. It is the image-forming activity or the imagination. It gives form to experience. It is aesthetic, for it depends on sense and sensing, not on thought and relating, and it is artistic, for it is pictorial, producing particular images. It also clearly is the first condition of intelligently directed action. I tread on a sharp stone or thorn, the pain sensation at once produces a reflex muscular action, but the sensation is no part whatever of the image of stone or thorn which my mind forms; it is this image which I perceive and which enables me to direct my next movement. I have therefore in my mind images, they are formed by my mind and they are as particular and personal as my sensations. Wherein, then, lies their advantage? And how do they enable me to have intercourse? They indicate that my mind has found expression. Their advantage is that they have given me language, and language enables me to have intercourse. My mind interprets signs. It experiences the sensations but it actively forms the images, and it is the images, not the sensations or the sensibility, which give to the mind its universe, the range of its activity.

But this of itself is not sufficient for intercourse. Images are expression, but they do not of themselves take us out of our world or inform us of other minds. The second condition of intercourse is action. It is because expression is continued into action that actions can suggest expression. Intercourse is not action provoking reaction, but expressive action evoking new expression. When the intuition in my mind has found expression in imagery, it leads to action, and the action being expressive and not mechanical, itself evokes new expression and arouses the aesthetic activity in

other minds. In the degree in which other minds approach our mind in its standpoint will our expressive action excite the imagination (*i.e.* the productive aesthetic activity) in other minds, and the more community of imagery will there be. It can never be identity, and there is absolutely no interaction between mind and mind in the meaning of the concepts of conservation and compensation and causal continuity by means of which physics systematizes nature. The scheme of intercourse is: (*a*) The stimulus to a mind to exercise its own activity by finding expression for its intuitions. The stimulus may be sensational or emotional. (*b*) The action in which the expression finds outward manifestation, voluntary and purposive; (*c*) the activity which the action evokes in another mind, primarily by sensation or emotion; (*d*) the responsive expression of the other mind. The psycho-physiological counterpart, so far as it can be traced, seems to be: (*a*) sensation, the psychical manifestation of the functioning of peripheral neural organs communicating with their main centres in the spinal cord, under the control of an inhibitory function exercised by the cerebral cortex; (*b*) imagination, the formation of sensuous images, the function of the cerebral cortex; (*c*) expressive action, the co-ordinated and integrative exercise of the voluntary muscles to produce speech or other linguistic action, the function of the motor areas of the cortex.

Let me now illustrate the theory by applying it to various particular familiar instances. I see from my window a flock of sparrows and finches feeding on the lawn of my garden, I open the door to walk out, and the moment I approach the lawn where the birds are feeding they take wing. Such action is voluntary and purposive, it is not reflex. We need not ask whether it is instinctive or intelligent as that has no relevance to the question we are considering. Is that action conceivable in the absence of an imaginative activity, that is, without the mental creation of images? Perhaps it will be said that visual sensation alone is in question here, and that visual sensation is already in its very nature imagery. Let that be granted. That is to say, let us admit that visual sensation cannot be

disintegrated on the same scheme as that which we employ for the sensitive points of skin sensations. Yet visual sense-data or sensibilia are conceived as discrete, as bringing nothing to consciousness but simple quality, as associated by purely external relations of similarity, contiguity and causality. These will never give an image. Grant that the creatures have memory as well as sensitivity, the sense-data are surely not conceived as retainable in memory,—memory reproduces images not sensations. Where do the images come from? The action of the birds clearly implies that the sensing man-coming-hither (to put it of course anthropomorphically, we possess no means of transforming human imagery into bird-imagery,—in the very nature of the case that must lie beyond us) brings before the creatures' minds the image of a visual or possible situation which by their action they can forestall. That is to say, the action posits an activity which cannot be identical with sensation or with contemplation, with merely passive reception of sense-data or with the unreciprocated action of independent objects on the mind. If any one thinks otherwise I desire to know how without allowing to these creatures an activity of imagination he can account for this factor in their action? For now suppose that I am in the habit of producing crumbs from my pocket and scattering them on the lawn, the action of the birds will be quite different—they will flock to the lawn instead of taking flight. But what difference is there in the sense-data? None whatever. The difference is wholly in the image the birds have created.

Let us take another example of animal behaviour but one involving actual intercourse between minds. I am going out. I go into the hall and take my hat from the peg, my stick from the stand. My dog follows my movements with growing excitement, frisks and jumps impatiently around me. It happens, however, that I do not want my dog to accompany me. I order him back, a command he understands and obeys with evident disappointment. Can that behaviour of the animal be explained by any other way than by supposing an active creative imagination in the mind of the dog? Of course, I repeat, I have no

means of correlating my imagery with dog-imagery,—but can I conceive the action if I admit no other factors but sense-data and relations of association? One thing surely is clear, there can be no communication between my mind and the dog's mind by means of our receptive faculties. There is not one single object in our perspectives of the universe which is identical to us both. There is no means of correlating our respective systems of reference, no way on which we can agree on a language by signs which are only signs. We must posit activity in each mind, and the only activity which renders intercourse possible is imagination. The dog's instincts,—the pack, the scent, the hunt,—are not my instincts. The dog's imagery is not my imagery. Nothing passes from the dog's mind to my mind or from my mind to the dog's, but each has the creative imagination which enables it to respond to sensation by expressing its own intuitions, and this makes significant action possible, action which can arouse another mind to responsive expression.

My last illustration is from fiction. Don Quixote with Sancho Panza is in quest of adventures. Both see approaching them two great clouds of dust. These are raised by two large flocks of sheep which some shepherds are driving across the plain. Don Quixote at once recognizes the two contending armies of the mighty Emperor Alifanfaron and of King Pentapolin. The supreme moment of his life has come. On his action depends the issue of the conflict. Sancho Panza recognizes nothing of all this, to him there are only the ordinary incidents of country travel—shepherds and flocks of sheep. Now wherein lies the difference between the two minds, and in what way are they brought into relation, and what is the basis of their intercourse? Clearly the difference is not in sense-data, nor yet can it be in any supposed independent objects. Both minds have the same data so far as physical reality is the causal source of their impressions. They each actually experience as sense impressions the clouds of white dust, to analyse no further. The sense impressions awaken in one mind the perception of armies, in the other

the perception of flocks of sheep. The only immediately apprehended objects are the dust clouds gradually revealing their cause whatever it may be. Now it will be at once objected that according to the very story itself we are supposed to allow that Don Quixote's imagination is insane, Sancho Panza's, however simple, is sane. Let it be so, it does not in the slightest degree affect the question of intercourse which I am citing it to illustrate. The artist has heightened the effect of his picture by exaggerating the contrast. Each mind creates imagery, and it is by the images and not by sensations or sense-data that communication is possible. The humour of the story is that the vivid imagination of the knight can impose itself on the commonplace imagination of the squire, even to the extent that when the catastrophe has occurred and the hero is lying prostrate as the result of the hail of stones from the shepherds, Sancho can still accept the hypothesis of enchantment. Why, then, do we smile at Don Quixote for the unreality of his vision and at Sancho Panza for the ease with which his simple-minded realism is disturbed? The answer, in my view, is that perception involves judgment and so marks the advance to another grade in the mental activity. Reality and unreality concern action as our story illustrates. Even Don Quixote, who cannot entertain the hypothesis of the non-objectivity of his images, must account for their failure to respond to the expectation on which his actions are based, he can only explain it by positing the malice of enchanters.

Intercourse, then, depends upon and is conditioned by the creative imagination exercised individually by each communicating mind. There is a sentence of Hegel which reads: "The natural man sees in the woman flesh of his flesh: the moral and spiritual man sees in the moral and spiritual being and by its means spirit of his spirit." We may adapt this to the whole problem of monadic intercourse. The plain man sees in nature an inert matter, spatially and temporally determined, out of which his mind and the minds of his fellow-beings have been formed, and which presents itself to those minds as their common object. The philo-

sopher recognizes in nature the expression of the organizing activity of his mind, and sees mind of his mind, spirit of his spirit, in the organizing activity of infinite individual minds ; each, like his own, self-centred and self-enclosed, and each, like his own, seeking outward expression for its intuition and forming thereby its actions. They are the monads, the only reals, a pre-established harmony, but a harmony inherent in their existence and nature, not imposed upon them by the transcendent act of a creator.

PART III

LOGICAL: THE KNOWLEDGE OF THE MONAD

CHAPTER XI

THE A PRIORI SYNTHESIS

In true philosophers there is always something more than themselves beneath their teaching, something of which they are themselves unconscious. It is the germ of a new life. To repeat mechanically what philosophers have taught is to suffocate that germ, to prevent it developing and becoming a new and a more perfect system.—CROCE.

MODERN philosophy has been determined in its form and matter as well as in the subdivision of its sciences by the work of Kant. The reason of this becomes clear when we study modern philosophy historically and in its development. Two lines of speculation, opposite in their directing principle, even contradictory in the method followed, meet in Kant. Each is recognized as legitimate, their opposition is reconciled, and a new method emerges in which the old antitheses are synthesized and the modern problem of philosophy becomes concrete. Kant named this the critical method. It rests on a philosophical discovery, the *a priori* synthesis. In Kant philosophy becomes pre-eminently theory of knowledge. It is theory of knowledge which divides the speculative from the practical reason, and which leads within the speculative realm to the distinction of aesthetic and logic and within the practical realm to that of metaphysics and ethics. The aesthetical, the logical, the metaphysical and the ethical problems as they exist in philosophy to-day owe their definite shape and relative significance to the form in which the philosophical problem was presented by Kant.

The two lines of philosophical development before Kant were, first, the philosophy of clear and distinct ideas, which

begins with Descartes and attains its full expression in Leibniz. And, second, the philosophy of sense experience, the theory of the origin of ideas and the laws of their association, which begins with Francis Bacon, and later is systematized, first by Hobbes, then by the English philosophers of the eighteenth century, attaining its full expression in the sceptical philosophy of Hume. In Kant the two methods are distinguished as dogmatism and empiricism, and it is this contrast he has in mind when he tells us in the *Prolegomena* that the scepticism of Hume roused him from his dogmatic slumber.

It is easy to see the origin of this divergent direction of philosophical development if we reflect on the nature of the problem which knowledge presents to us.

When without any prepossession derived from philosophical theories we attend to the experience we name cognition, we find that it is not immediate, simple and self-explanatory. We cannot say that in having the experience of knowledge we know what knowledge is, in the same way in which we can say that we know what pain, or heat, or cold is, when we experience the sensations. Knowing refers beyond itself and also presents two aspects. There is an activity, knowing; and there is a passivity, something is known. This distinction, which is all that the experience itself yields, seems to imply something beyond itself as its condition. We reason, therefore, and infer from the activity that there exists an agent, and this we call the mind. We reason and infer from knowledge that there exists an object, and this existence we then represent as the independent condition of knowing and not as itself conditioned by the knowing relation. By this natural reasoning common sense reaches the notion of nature and mind as two independent existences, and by such reasoning it defends the notion when it is challenged. In philosophy we name this theory the naive realism of common sense. According to it there are objects independent of knowing subjects, and subjects (minds or selves) independent of objects, and knowledge is a relation between them which does not affect or qualify the existence of either. Know-

ledge means in fact that there exists in mind a faculty or power of discerning the existence, and discovering the nature, of an external object. There are two things, a mind and a world, and an external relation between them.

The dualism of mind and world, which common sense thus accepts uncritically as the necessary ground of living action, is the problem of philosophy. If the analysis of experience yielded immediately the theoretical ground of our practical belief, there would be no philosophical problem of knowledge and no need for a theory of knowledge. It would be enough to have the experience of cognition in order to know its meaning and nature. It is not so. In order to discover the meaning of cognition we must reflect upon experience and bring it before the mind as an object for analysis. The moment we do so we become aware of a logical discrepancy between the object of knowledge as real and the knowledge of the object as ideal, and this discrepancy is the first form in which knowledge becomes a problem of philosophy.

Two difficulties confront the philosopher from whatever standpoint he approaches the problem. They concern the two substantive terms which cognition seems to imply,—mind and thing. The first is the difficulty which underlies all the groups of problems known as problems of the self. It is in the nature of a paradox. The substantive term of the knowing relation on its subjective side—the self or ego—is not, and *qua* knowing cannot be, object of knowledge, and therefore the knowing self is itself unknown. The second difficulty concerns the substantive term on the objective side. The independent object or thing is not the known object. The object known gives us ground for the presumption that the object exists independently, but knowledge gives us known object not its independent existence. Strictly speaking, therefore, although knowledge is a relation between subject and object yet subject and object are themselves unknown.

These difficulties may be presented in another way. That which in experience we know most immediately we can never know objectively, and that which we know

objectively is never existentially independent and therefore free from subjectivity. What we are ever striving after and can never attain is to know the mind without objectivity and the thing without subjectivity. If we maintain that such knowledge is impossible, the retort is that if there be no knowledge of a real world, in its independence of knowing mind, physical science is impossible. If to avoid this we hold that knowledge is an external relation between independent existences, then the retort is that truth is a miracle, or at least an unfathomable mystery, and philosophy is impossible.

But may it not be that the common-sense belief, that objects known and subjects knowing exist in reality as they exist in idea, is true? Is it not possible that in the ideal order of knowledge we have the exact counterpart of the real order of nature, and that this nature is indifferent to whether it is known or not? The answer depends on what is meant. There is a sense in which we may say of anything of which we are necessarily ignorant that it may be true, and in saying so we do no more than express our ignorance. If, however, we mean by truth positive knowledge which will stand the logical test of consistency, then we must answer that the common-sense belief is not true and cannot conceivably be proved true. It is in the very discovery that common sense is logically inconsistent that philosophy takes its start. Still, we may ask, is it not possible that the result of the philosophical quest for a theory will be the conclusion that the common-sense belief is true? Again we must answer that this is impossible. Philosophy may, and indeed must as part of its task, show the ground of the common-sense belief, but to adopt it as a philosophical conclusion would simply condemn philosophy. It would mean that the quest for a theory of knowledge so far from arising in a need of intellectual satisfaction is a false step which the wise man will avoid taking. To return to the uncritical starting-point as the reasoned conclusion could only prove that philosophy had made false route.

Now to many philosophers it seems that in pursuing theory of knowledge philosophy is making false route.

Theory of knowledge seems to them a hindrance, a stumbling-block and rock of offence, in the path of philosophical advance. Their first care is to clear it out of the way. It seems easy to do and justified by results. Philosophy is much more than theory of knowledge, but allow it to be blocked by this theory at the outset and we are condemned, they say, to remain for ever outside the promised land. We must recognize the problem, of course,—Berkeley and Hume have made it impossible for any one to ignore it—but we need not be turned aside by it. Let us make the hypothesis that the common-sense belief is right and see whether we shall not be justified by the result. The attractiveness of most of the modern realist theories of knowledge is not that they solve the problem but that they seem in this way successfully to shelve it.

There are many inducements to such a course. Not the least is the underlying bias in our nature which manifests itself in the strong inclination to think that a practically workable belief must be a theoretically true belief. Even in philosophy we are swayed by the unconscious assumption that common sense is in the last resort the positive criterion of truth. We are even conscious of a strong tendency to discredit any theory, however consistent it be and rational in itself, if it conflict with common sense. And yet there is the history of thought to remind us that self-evident beliefs are continually being discredited. Common sense indeed not only sets our problem, but accompanies every effort to solve it with a sustained bias against its solution, which weakens intellectual effort and warps judgment.

We can indeed enter on philosophy by making the hypothesis that the existence and nature of a world contemplated is immediately and absolutely disclosed to a mind contemplating. We can use the hypothesis as a bridge to pass directly from knowledge to reality and thus avoid what some call the morass, others the impassable gulf, of theory of knowledge. But it is a hypothesis, and no description of it as naive realism can disguise its hypothetical nature. This is as much as to say that we can choose to begin philosophy with a principle which is false

to philosophy. Hypothesis as a starting-point of philosophical theory is a false step we cannot retrieve. "Hypotheses non fingo" should stand as a warning post at the entrance to philosophy. Science makes hypotheses, they are indeed the very instrument of scientific advance. Science is utilitarian and therefore hypothesis is for it a rational method, it meets the demand for the satisfaction of theoretical truth. Suppose we start with the assumption that our impressions and ideas, which we distinguish as ideal existences from things and relations, are simply the discovery or discernment of real existences, how can any subsequent reasoning make that assumption cease to be an assumption? The hypothesis, for such it is, which we pose at the beginning, is thenceforward an essential part of any logical conclusion at which we can possibly arrive. How can we bring the hypothesis to a test, such as is common enough in science, which will cause it to lose its character of hypothesis and become the theoretically consistent account of knowledge which our intellect demands for its intellectual satisfaction? The hypothesis which we thus introduce into philosophy is not needed in practical life, and in philosophy it is useless, for there is no method of philosophy by which a hypothesis can be submitted to a criterion.

There is, however, in the actual experience of cognition something which itself seems to impel us to pass directly from subjective thinking to an existent reality independent of thought. We are dissatisfied and feel as though we were thwarted, or held up and suspended in air, so long as the passage to objective reality is in doubt. Yet the moment we reflect on our experience we see that knowledge must in the first instance be a purely subjective state of the knower, notwithstanding that its whole meaning depends on its claim to be truth about existence. Hence our impatience to be transported to this existence and to be able to feel that it is free from any taint of subjectivity. In the mathematical and physical sciences we seem to have achieved this pure objectivity, and for philosophy to fall short appears as a handicap. But in truth it is this apparent handicap which constitutes the strength of philosophy and

raises it high above the special sciences in dignity. For philosophy is the science of science. All reality, subjective as well as objective, mind as well as nature, mind inclusive of nature, nature inclusive of mind, is the subject of philosophy. This is why assumptions and hypotheses are abhorrent to the philosopher, he has no criterion outside knowledge by which to test knowledge.

How, then, does philosophy begin? Every one will agree that it begins with the study of experience; that the study of experience is only possible if the mind has the power to reflect; that however direct the reflexion on experience, knowledge of experience is, as compared with the experience reflected on, indirect, and yet the experience of reflecting on experience is one and continuous with the experience reflected on. This means that experience is one with consciousness, or, what is the same thing, that experience is self-conscious by right and in its own essential nature, that self-consciousness is not acquired. This, reduced to its simplest position, is the necessary standpoint of a philosophy which eschews hypothesis. We take experience as it is and analyse it in right of the self-consciousness it possesses. Now when the experience of cognition is submitted to this analysis it yields at once an important distinction—the distinction between act and object. The act is the knowing, the object is the known. The act is the apprehension of the object, whatever be the mode of acting or the character or nature of the object. Mode of acting and character of object known are, however, always correlate. If, for example, the act be sensing, the object is sensation; if it be perceiving, the object is percept; if thinking, thought; and so throughout. The object is always presented, passive, or given, the act is always directed in or towards it. It is on the interpretation of this twofold aspect of cognition or of this dual nature that the most fundamental divergence in metaphysical theory arises. According to some philosophers it implies that mind and nature are dual existences, and that knowing is an external relation between them. To them the common-sense view that things are in their essence and independent existence what we in act of

knowing discern them to be, is justified. On the other hand, to some philosophers it implies the direct contrary, for it proves that the whole world is only object in relation to subject, perception of a perceiver, and that its reality is therefore essentially ideality.

Without trying at this point to decide between these divergent directions in metaphysical theory, we may at least point out that so far as the first interpretation finds a justification of common sense, it is justification, not of common sense, but of the hypothesis which underlies the view of common sense. Philosophy makes no hypothesis but validates the hypothesis of ordinary working life. The second interpretation, on the other hand, condemns the common-sense hypothesis as illusion, and is in consequence committed to show how the illusion arises and what purpose it serves.

Between knowledge and truth there exists no difference. Knowing and knowing truly are one and identical: knowing falsely is not knowing. This means that truth is not the object of knowledge but the validity of knowledge. It means also that the opposition of error to truth is not a distinction between knowing and not knowing, but an opposition within the one distinct concept of knowledge or truth. It is clear, then, that if the object of knowledge be something confronting the knowing mind, an outside which in knowing is brought inside, the act of knowing must be essentially an act of faith and its validity miraculous. It is this problem of validity which has seemed imperatively to call for a hypothesis. If the act of knowing is an act of faith who or what is to assure us of its validity?

There is, then, a problem of knowledge which meets us at the very beginning of philosophy, and a peculiarly discouraging problem, because it seems to challenge the very possibility of philosophy. We want to study reality and our only means is knowledge, yet this very means seems itself to interpose an obstacle and to prevent our ever reaching the goal. Could we only, we think, place ourselves at the very beginning of life and watch the genesis of knowledge, surely then we should understand its nature. Many

have tried to surmount the difficulty by some device, natural or artificial, which would place us, at least imaginatively, in the position of surveying knowledge from the independent standpoint of reality, but all such attempts only serve to conceal or disguise the real problem.

The reality and inevitableness of the problem of knowledge will be manifest if we consider three definite and typical instances of the attempt to meet it in the history of philosophy. To Descartes, to Berkeley and to Kant, knowledge presented itself as primarily a problem. It seemed to interpose a veil before the mind's view of reality, or even to bar altogether the pathway to reality. Descartes presented the problem of the validity of knowledge in the clearest and most striking form in which it has ever been stated. He propounded a principle of universal doubt, but so far from it leading him to absolute scepticism it revealed the ground of certainty. Probably no philosopher has ever worked with surer confidence than Descartes in working out the principles of a philosophy of nature and producing the definite scheme of a mechanical system of the universe. But a formidable obstacle confronted him at the outset. It was not exactly what we now call the problem of truth. It was not, that is to say, the question whether truth be correspondence or coherence and what in either case is its criterion. It was more profound. It was, if I may state it in my own terms, how can we be sure that our experience or any part of our experience is knowledge of real existence? The experience of being at rest, of remaining fixed in one spot during a succession of events in time, is consistent with the real existence of translation. The senses are deceptive. This was the reason for the method. How and when is experience knowledge? Only by doubting everything that can possibly be doubted shall we arrive at certainty. Only if we can point to one absolute certainty shall we know what in experience characterizes knowledge. To say that we cannot know until we first of all know what knowing is, sounds self-stultification, and is often so represented, but to refuse to recognize the difficulty is to leave the whole of philosophy on an unsound

foundation. We cannot learn to swim without plunging into the water, but only the fool who courts disaster plunges into the water in order that he may learn to swim.

Let us see, then, how this problem of knowledge resolved itself for Descartes. Here are the opening sentences of the *Principles of Philosophy*: "We were children before we became men, and just as then when we were without the full use of reason our judgments concerning things presented to our senses were sometimes right and sometimes wrong, so now we find many premature judgments preventing us coming to the knowledge of truth and even obstructing us. There seems one way of escape, it is that once at least in our lives we should undertake to doubt everything wherein we can discover the least suspicion of uncertainty." And here is the conclusion of the *Principles*, written when the whole mechanism of nature has been explored: "I distinguish two kinds of certainty. The first is called moral, it suffices for the regulation of our conduct. . . . The other kind is when we cannot think that the thing can be otherwise than we judge it to be. This certainty is founded on a very sure metaphysical principle. It is that God, being sovereignly good and the source of all truth, for he is our creator, has bestowed upon us the power or faculty of distinguishing the true from the false which cannot be deceptive when rightly used. It shows us evidently that a thing is true."

This famous principle—that God in the case of evident ideas does not deceive—is in its very nature a hypothesis, and in accepting it we make our whole knowledge of external real existence depend on an assumption. But there is all the difference in the world between an assumption consciously adopted as a conclusion and an assumption unconsciously latent in an argument. The philosophical importance of this hypothesis in the conclusion is not whether it is probable or improbable, and in what degree, but that it stands for failure not success. If ever there has been a pure inquirer, conscientious and anxious at all costs to attain to truth and know real existence, it is Descartes. He has no interest in doubt as doubt, no

inducement to doubt for the sake of doubting, he doubts in order to know, as the medieval philosophers believed in order to understand. Doubt for Descartes is no idle speculation, it is the search for truth.

The method led Descartes to the immediate discovery that there is one truth secure against possible disturbance by doubt, namely, the existence which is given in the act of thinking itself. "I think, therefore I am" is a truth which doubting—for doubting is thinking—affirms. If, then, I consider this truth I may find out what it is which characterizes knowledge, and I discover that it is clearness and distinctness which identify idea and existence. I have not discovered a truth, I have discovered what truth is, clearness and distinctness of the idea which in this typical case is self-evidence. So, then, we possess at least one truth in which the passage from thought to existence is immediate. It is not the ontological argument, because it is not an argument, but it is that which is to give to the ontological argument a new meaning and a new force, for here in the very fact of thinking we have an idea which includes existence.

In "I think, therefore I am" we possess a truth which is absolute so far as the relation of thought to existence is concerned, but it is a truth which has a limit in extension. The existence which is affirmed is confined to the point-instant affirmation. It loses its immediacy directly we try to extend it beyond the actual point which marks its present. It affirms what is, not what has been or will be. I may say, for example, "I remember, therefore I am," if by remembering I mean my present thinking, but I cannot affirm the existence of the object remembered from the fact of my present memory. How, then, am I to pass from the immediacy of idea and existence in the present moment to the identity of idea and existence at other moments and in other points?

It is clear that if I am to pass immediately—that is, without inference, hypothesis, or assumption, any of which would introduce doubt—from the particular truth of my own existence to the truth of existence in general,

it must be because I am able to find in the idea of this existence the existence itself. That is to say, the idea must contain existence in precisely the same meaning as that in which the "I am" of existence is contained in the "I think." Descartes finds this in the idea of God which contains the clear and distinct truth, God exists. This doctrine is very important and calls for careful study. It is the familiar ontological argument, and Descartes propounds it in the identical terms of the old theology, but in its new setting it has an entirely new significance. God exists is a truth which is self-evident and immediately certain in the clearness and distinctness of its idea. The God-idea includes existence in precisely the same immediate sense in which the "I think" contains the "I am." God is a necessary idea if existence be not momentary, for the "I think, therefore I am" contains nothing in the idea which will continue or sustain existence from moment to moment. The necessary existence of God is not, therefore, a dogma which Descartes wants to affirm in the interest of religion or morality, it is a necessary stage of the search for truth.

The ideas of the self and of God are clear and distinct ideas whose truth is guaranteed in the fact that existence is not separate from but contained within the ideas. It is the exact opposite with my knowledge of nature. If I know material substance, then by the very notion of it I know an existence which the idea does not contain. It is the very essence of matter, according to Descartes, that it confronts the idea, stands over against it by reason of an attribute, extension, which the idea does not possess. What is truth when existence is separate from the idea? How can I know an existence which my ideas do not contain? In this case doubt is not excluded. Not only so, but I am continually discovering that my ideas are false and am constantly suspicious that they are inadequate even if not false. Have I any criterion of truth? The method has shown me that the ideas which exclude doubt, the self and God, are clear and distinct, it is impossible to have them as ideas and to doubt their existence

in fact. They are self-evident. My ideas concerning external existence, however, differ in the degree of their clearness and distinctness. Some, particularly those of sense, are obscure and confused, some, particularly those of intellect, are clear and distinct, and with the degree of their clearness and distinctness goes the difficulty of doubting their reality. Hence we may conclude that clear and distinct ideas are true. But we have not excluded doubt, —is it possible to do so? Only by founding an argument on our idea of God. The idea of the most perfect being must include veracity—we cannot think that God deceives. But, we object, we are deceived, for are not the senses deceptive? The purpose of the senses is not, Descartes replies, to give us true ideas, it is to preserve our body from injury, but the purpose of our intellect is to give us truth. To suppose, then, that in the case of clear and distinct ideas, God our creator is our deceiver, is to suppose God false to the very principle of clearness and distinctness which he has himself determined to be the criterion of truth.

This is not Descartes's philosophy, but it is the problem of knowledge which lay in the path of his philosophy.

Let us now consider the second instance we have chosen —Berkeley. One of the most interesting human documents which has been preserved to us is the "Commonplace Book of Occasional Metaphysical Thoughts" which George Berkeley kept during his student years in Trinity College, Dublin. Before he was twenty years old he had formed the design of a Treatise which was to be a complete system of philosophy. In the "Commonplace Book" he jotted down as they occurred to him and without form the thoughts which were to be developed in the great work. The Treatise was never written. The work entitled *A Treatise concerning the Principles of Human Knowledge* was probably in its original form intended as part of it, and was perhaps thrown into its present shape when the *Essay towards a New Theory of Vision* had met with success. In the "Commonplace Book" he had various notes intended for the great design. Thus we read: "Mem. To premise a definition of idea." Against this is placed a capital "I," indicating that the

memorandum is for his Introduction. Then there follows this note: "The 2 great principles of morality — the being of God and the freedom of man. These to be handled in the Second Book." The first and third books of the Treatise are also alluded to. Why was this work not only never completed but first laid aside and then abandoned? The important philosophical works which contain the theory we associate with Berkeley are short, unsystematic and occasional, and all written at the beginning of his literary life. Why he turned aside from his purpose and then abandoned it we do not know. Probably his life with its widening practical and philanthropical schemes is the sufficient answer, but the works he has left and the notes in his "Commonplace Book" show us very plainly the direction of his thoughts. They enable us to see what books he was reading and the effect they had on him and the kind of problems that fascinated him.

This "Commonplace Book" begins about 1704 when Berkeley was in his twentieth year. He is then a graduate, having matriculated when he was fifteen. The *Essay towards a New Theory of Vision* was printed in 1709. It was followed by the *Treatise concerning the Principles of Human Knowledge* in 1710, and the *Three Dialogues between Hylas and Philonous* in 1713. We are able from the "Commonplace Book" to see the contemporary philosophy which he studied and the order in which he read it. He read Newton, Locke and Malebranche in the order named. He had evidently no acquaintance with Descartes's *Principia*, and this seems strange seeing how critical and hostile he is towards Newton. "Newton begs his principles; I demonstrate mine." He read Descartes's *Meditations* and the *Observations* on them, but probably not until after he had become acquainted with the Cartesian theory in Malebranche. His only reference to Hobbes is in connexion with Descartes's *Meditations*, and Leibniz is only referred to in relation to Newton's *Theory of Fluxions*. Spinoza he mentions more than once, but evidently the common prejudice had prevented him making direct acquaintance with his works. Locke he is reading with diligent care

and sustained admiration. In criticizing him he describes himself as a pigmy in comparison with a giant. But the determining factor in the direction of his philosophical research is clearly Malebranche, that is, Cartesianism as expounded by Malebranche. The *Recherche de la vérité* had a striking effect upon him, drawing him off from his original purpose. I am not referring to any resemblance, apparent or real, between Malebranche's theory of vision in God and Berkeley's theory that God sustains the world in perceiving it, nor am I suggesting that Berkeley's theory is derived from Malebranche and not original. The two theories are essentially different and probably without any direct relation to one another. The influence I am speaking of as determining the direction of Berkeley's speculation is that of the Cartesian theory of the deceptiveness of the senses, brought out with striking force in Book I. of the *Recherche*. It was a direct challenge to the principle which Berkeley had accepted from Locke, and led him to reaffirm Locke's principle against the Cartesians. At the same time it called forth a criticism of Locke and a profounder study of the principle itself. The immediate effect was the *Essay towards a New Theory of Vision*.

This biographical note is particularly important just because Berkeley's original research in philosophy belongs, as we have seen, to his early years. His knowledge of contemporary philosophy must have been derived from his own reading in the leisure of his regular courses of classical and mathematical studies. His service to philosophy is not that he developed by critical study the work of his predecessor Locke, but that he took up the challenge presented by the Cartesian method of doubt.

In fact, Berkeley, like Descartes, has the ideal of a philosophy wherein, as in the promised land, we may dwell securely in the sure possession of truth, and finds that there is a formidable obstacle at the outset — a doubt concerning knowledge itself, concerning its reality, concerning its validity. No advance is possible unless this obstacle is removed. The Cartesian principle, so far from overcoming it, has made it, if possible, more impassable

than it was, for it separates existence from knowledge and so makes it impossible to unite them.

Here are some of the notes in the "Commonplace Book" which disclose Berkeley's leading thought.

Mem. Diligently to set forth how that many of the ancient philosophers run into so great absurdities as even to deny the existence of motion and those other things they perceived actually by their senses. This sprung from their not knowing what Existence was, and wherein it consisted. This was the source of all their folly. 'Tis on the discovery of the nature and meaning and import of Existence that I chiefly insist. This puts a wide difference betwixt the Sceptics etc. and me. This I think wholly new. I am sure this is new to me.

I am the farthest from scepticism of any man. I know with an intuitive knowledge the existence of other things as well as my own soul. This is what Locke nor scarce any other thinking philosopher will pretend to.

The supposition that things are distinct from ideas takes away all real truth, and consequently brings in a universal scepticism, since all our knowledge and contemplation is confined barely to our own ideas.

These notes enable us to see clearly what Berkeley's problem is. Scepticism in philosophy is unavoidable if knowledge of existence is unattainable. Knowledge of existence is unattainable if existence and idea are separate things. But in sense perception there is no separation of idea and existence. The senses do not deceive us. They cannot deceive us, for the objects of knowledge in sense experience are perceptions and not an existence separate from perception. The ordinary man may think that his perceptions exist when he is not perceiving, but only philosophers suppose that there is an existence of a sensible object independent of its perception. This is a pure invention of philosophers and an absurdity. *Esse* is *percipi* is therefore the direct contradictory of the Cartesian theory that the senses are deceptive, that truth is adherent to ideas, that its criterion is subjective and that knowledge depends on the truth of a hypothesis.

Berkeley's doctrine that *esse* is *percipi* was indeed mainly

used by him to give force to his criticism of Locke's idea of material substance, but primarily it was the challenge to the Cartesian principle and the affirmation of the antithetical principle. The curious thing, however, about Berkeley's theory of knowledge is that, although it adopts as its principle the direct contradictory of the Cartesian principle, it leads to precisely the same dilemma. What is still more curious is that in attempting to meet this dilemma it adopts what is practically the identical device. Berkeley fell back for his support of an existence which would give continuity to the intermittent and fragmentary perceptions of individuals, on the idea of God as a continuous perceiver.

We see therefore that both positions present a problem which cannot be solved without transcending the individual experience. If there be an existence independent of idea, then the problem is : How can idea, whatever its clearness and distinctness, impart knowledge of existence ? If there be on the other hand no existence which is not also idea, then the problem is : What is it that exists in the intervals of individual perception ? In each case there is a problem of knowledge which theory of knowledge cannot dispel, and in each case it effectively blocks the entrance to the promised land.

Let us now consider Kant. His philosophy is theory of knowledge from beginning to end. His work is not an inspiration or youthful enthusiasm, it is the mature reflexion of the professional philosopher. Kant was in his fifty-eighth year when he published the *Critique of Pure Reason*. His whole life up to that time had been engaged in teaching, and for the previous eleven years he had held the professorial chair of philosophy at Königsberg. The two Critiques which followed the *Critique of Pure Reason* are a development and integral part of the whole conception. To Kant, therefore, the theory of knowledge does not present itself as an obstacle in the path to systematic knowledge, it is not a bridge, constructed *ad hoc*, to enable the mind to cross the gulf which separates the idea from the existence, on the contrary it is the whole special problem

of philosophy. It is not even its first and main business, it is its whole business. Philosophy in Kant has ceased completely to be encyclopaedic as it was to Aristotle and later to Francis Bacon. It stands in necessary and peculiar relation to the mathematical and natural sciences, but it is distinguished from them by its special task and the method which that task imposes. Kant has revealed to us how this came about. In the *Prolegomena*, published two years after the great Critique and intended to elucidate it, he tells us that the scepticism of Hume first roused him from his dogmatic slumber. It forced upon him the question,—Is metaphysics possible? Is the knowledge of reality within our attainment? This could only be answered by investigating the conditions of the possibility of knowledge. This research became of necessity the whole philosophy of Kant. It is forced upon him because each of the opposite and mutually contradictory principles which philosophers have followed has failed. The alternative methods, the one he calls dogmatism, the other empiricism, are alike unworkable. One is a vicious circle from which there is no outlet, the other is a scepticism from which there is no advance. Yet neither can be dismissed. Each principle indicates something fundamental and indispensable in knowledge.

Let us try and rethink the reflexion which led Kant to his great philosophical discovery. First, then, those are right who hold that knowledge depends on clear and distinct ideas and that truth is clearness and distinctness of ideas. It is undeniable that the belief which I accord, and cannot withhold from, the propositions of mathematics rests on self-evidence and on the immediate apprehension of the import of the ideas themselves. But then, on the other hand, knowledge depends on sense experience. The perceptions of sense are without and independent of me in the meaning that they are not drawn out of my own nature and they are not at my command nor under my control. Their order and their import are independent of me. The senses often deceive me, but this only means, not that the sense experience is itself deceitful, but that the ideas which

I bring to its interpretation are at fault. Clearly, then, knowledge requires and supposes both sense perception and thought, both percepts and ideas. The senses provide the matter, the ideas the form of knowledge. How do they come together and on what principle are they combined? Sense experience is original, does it carry with it the relations which make it knowledge of a world? Clearly not, sense experience is in its very nature a manifold, a manifold without connexion or any principle of unity in itself. It is impossible by analysing a pure datum of sense to discover in it a necessary connexion with another datum. But ideas are in their very nature relations. Whence then are they derived? They are not derived from sense perceptions for these do not contain them. They must belong to the constitution of the mind, they must come from within and not from without, and this also agrees with experience. But then, if my mind possesses ideas or rational forms, are not these sufficient? Will they not of themselves give me knowledge, restricted, it may be, but yet absolute, knowledge which may grow as it advances? No, for there is a constituent of knowledge which ideas cannot give. Thinking will not produce sensation. Knowledge then is a synthesis. Its condition is that two separate, completely heterogeneous, factors exist in unity. Neither of these factors can of itself bring about the synthesis. The synthesis is original and *a priori*. It is not brought about by experience but is the condition of experience. This was Kant's great philosophical discovery.

The *a priori* synthesis does not enable Kant to give a satisfactory answer to his question,—Is metaphysics possible? Instead of that it leads him to present the problem of philosophy in a new way, but it is still a problem. The ideas or concepts,—forms of sense intuition and categories of the understanding,—all that the mind brings to constitute knowledge, are empty and void in abstraction from sense intuition, and sense intuition is without connexion, interpretation, meaning or significance in its pure existence. "Thoughts without content are void, intuitions without conceptions are blind." Notwithstanding his discovery that

knowledge depends on a synthesis before experience, it yet seems to him that the factors of the synthesis point to independent realms of reality outside the relation. Knowledge is of phenomena, but the factors which constitute phenomena are noumena. Noumena are things-in-themselves, and of things-in-themselves we have no knowledge. So at the one end, behind the sense intuitions, there are real causes which lie beyond the reach of the mind, and at the other end, behind the activities which find expression in forms and categories, there are realities which we do not know as objects but only as regulative ideas. Knowledge is valid. We are in possession of truth. But knowledge is limited, it is confined to phenomena and phenomena do not exhaust reality. Noumena by the very condition of knowledge are unknowable. So then if metaphysics be the science of reality, metaphysics is impossible by reason of a natural disability.

Kant's philosophy, then, presents the aspect of failure: nevertheless it registers a distinct and notable advance. The *a priori* synthesis is a new concept. I have tried to show its historical origin in the two antithetical principles which were adopted by rival methods and reconciled in the critical method. Let us now look at its philosophical origin.

The concept of an *a priori* synthesis is in what is essential to it the concept of the monad. I do not mean that it is the historical evolution of the monadic concept of substance. I mean that it affirms a theory of knowledge which derives its whole force, and depends for the conviction it brings, on that concept. A synthesis before experience of factors, which in experience are presented as opposite in their nature, is only a rational idea if it is intended to affirm an original unity of nature, that is, a unity pertaining to the reality of the factors related in the synthesis. Try to imagine the factors as originally diverse,—real but empty forms, real but blind sense content,—and imagine that these are somehow adventitiously associated as a condition of experience, and the whole concept becomes fantastic and incredible in the highest degree. The factors are not

objects, but the objective factor is opposed to the subjective. Subject and object are synthesized in knowledge. It is this which destroys the value of any analogy we might be tempted to draw from nature, as for example, chemical synthesis, where we bring together pre-existing substances with definite sense qualities and obtain a new substance with new and different sense qualities. And more than this we see that it is just in so far as Kant's synthesis is at variance with the concept of the monad, that is, in the affirmation of a reality, the thing-in-itself, which falls outside the synthesis, that there is failure. The monad has limitations, but its limitations are not external, they are intrinsic to it. The monad is a complete whole, no reality lies outside its perception. What distinguishes the monads is not their subjectivity. A subject of experience may present to itself a monad as the object of its experience, but the reality of the monad so presented is not its objectivity to another subject but its own essential subjectivity. There is no reality outside the monad. If the objects of knowledge, Kant argued, are things-in-themselves and not merely phenomena, if the understanding is itself perceptive, not merely discursive and dependent on a sensuous content supplied from without, then Leibniz is right. It is Kant's conception of the thing-in-itself, now presented as an unknown cause of sensuous affection, now as an unnavigated ocean bounding the island of experience, and yet again as the regulative idea which imparts unity to experience while standing outside it, that brings contradiction into the Kantian theory of knowledge. This contradiction once overcome, the *a priori* synthesis becomes the positive expression of the original fundamental activity of mind.

Modern philosophy we have seen, then, begins with the attempt to present a comprehensive view of reality, mind and nature, systematic and coherent, based on a principle which assures its truth and excludes doubt. It meets with an obstacle at the outset in the problem of knowledge itself. For knowledge seems to have two sources. One is sense awareness, the other is intellectual and non-sensuous. These two sources of knowledge give rise to the

formulation of antithetical principles, distinguished later as dogmatism and empiricism. Each principle ends in failure, for the difficulty in each case is to pass from thought to reality, or to find a criterion which will assure the validity of knowledge. The first principle rejects sense awareness. The senses are deceitful, their purpose or end is utilitarian, not logical, they do not lead us to truth; only ideas are true, and the degree of their clearness and distinctness is the degree in which doubt and uncertainty are excluded. The principle fails where it is most needed, namely, in physical science. The second principle rejects the belief in an inferred real world as the cause of knowledge. It accepts sense presentations as immediate reality. The objects of knowledge are perceptions, not the cause of perceptions. And this principle fails because sense awareness in its immediacy will not yield the ideas of necessary connexion,—continuity and permanence,—which physical science requires. The two antithetical principles are then brought together in the principle of criticism. Both are recognized as equally necessary conditions of the possibility of experience. Their opposition is recognized in the concept of an *a priori* synthesis. The *a priori* synthesis means that knowledge is sense content subsumed under intellectual forms. The critical principle in taking the two factors as diverse in origin and brought together in the synthesis, the one coming from without as sense content, the other coming from within the mind itself as form of unity, gave rise to the doctrine of the thing-in-itself, and so the principle failed before the problem of the distinction of phenomena and noumena. But this distinction is already overcome in the concept of the monad and its self-centred activity. The monad is thing-in-itself and its activity is perception. No reality falls outside it. The factors, therefore, which form the synthesis in which knowledge consists exist in their unity in the monad.

CHAPTER XII

THE CONCRETE UNIVERSAL

There is nothing either good or bad, but thinking makes it so.—SHAKESPEARE.

In the beginning was the Word, and the Word was with God, and the Word was God. The same was in the beginning with God. All things were made by him; and without him was not anything made that was made.—ST. JOHN.

THE concept of the *a priori* synthesis opened a new era in the historical evolution of philosophy. In proposing a new theory of knowledge Kant was in effect propounding a new theory of reality. The successors of Kant were not slow to realize that the new theory was much more than the Copernican revolution in philosophy, which Kant himself had suggested, much more, that is to say, than a mere change of standpoint which reconciled contradictory appearance and removed the obstacle to knowledge presented by the seeming impossibility of knowledge. In the first place it is clear that, if experience depend on the *a priori* synthesis as its condition, the essence of real existence is activity, for activity is implied in the idea of synthesis. In the second place it is clear that if knowledge and reality be each the expression of that activity, they cannot be disparate. The notion of a material or stuff, essentially inert, independent of the passive subject of experience, to whom by reason of his mental or intellectual nature it is revealed by means of sense impressions, must give place to the notion of an original activity, the subjective and objective factors of which are internal, and therefore capable of being disclosed to reflective analysis. Philosophy, instead

of exercising itself with the concepts of substance and cause, can now turn to the task of comprehending the nature and mode of activity. We need not try and follow the steps by which the new concept was reached. It was pre-eminently the work of Hegel. The new concept is the concrete universal; the new method which that concept called for and revealed is the dialectic. In other words, we are given a new concept of the object of metaphysics and of the process of logic, and this involves a new view of the nature of logic and of the subject-matter of the science of logic.

If Hegel had lived after, instead of before, the great scientific generalization of the nineteenth century, we should most certainly have attributed his philosophy to reflexion on the discoveries of physical science. We are only beginning to see how completely harmonious the modern physical theories, attained by experimental method, are with the philosophical doctrines speculatively worked out long before experiments had been contrived or even thought of. It would be difficult to name a more perfect illustration of the concrete universal of Hegel than that offered to us in the modern electrical theory of matter. So striking is the analogy that, but for the fact of historical precedence, the logical doctrine of Hegel must have seemed to have been moulded on the physical theory. And yet, strangely enough, throughout the great period of expansion of scientific discovery, Hegel's philosophy suffered from the reproach of being anti-scientific and obscurantist in its aim and method, and on that account fell into contempt. It will be both useful and instructive to institute a comparison.

First, then, let us ask, what is a concept? It is a term which is not confined to philosophy. It has a definite meaning in common-sense discourse and in physical science. Concepts are the clear and distinct ideas of the understanding which the Cartesians opposed to the obscure and confused ideas of immediate sense experience. Equally, concepts are the general ideas which the empiricists opposed to the percepts, percepts being particular and sensible. Ordinarily we think of concepts, not as opposed to percepts, but as having the function of supplying their place when

he conditions of experience make perception impossible. n physical science concepts stand for actual reality itself s distinguished from the particular aspect of it at any noment or at any place. Percepts may be the appearance f reality, concepts cannot be, for concepts do not appear, hey always purport to be the exact mental equivalent of he reality which does appear. Take, for example, the oncept of wireless telegraphy and consider how in ordinary iscourse the concept is indistinguishable from the exist- nce. I cannot have the concept and at the same time hink the reality different from the concept. Saying that have the concept is the same as saying that I know the eality. I may, of course, have some fanciful image of the ay in which telegraphic communication is effected, but his is not to have the concept of wireless telegraphy. When I was a child I had the concept of God in heaven istening to the prayers addressed to him by me on earth. That concept was indissolubly bound up with reality. When the concept dissolved the reality dissolved. A new oncept brought with it a new reality. Concepts depend n sense-imagery, but they are not the sense-imagery in istinction from the reality, rather are they the reality in istinction from the sense-imagery. Concepts, then, are n one of the ordinary meanings of the term the opposite f percepts. They are a kind of mental reconstruction of ense-imagery enabling the mind to complete what is ncomplete in its immediate apprehension. A mind able o apprehend all reality in a single intuition would have o need of concepts.

There is another ordinary and familiar meaning of con- epts. Concepts are universals as distinct from particulars. Whatever is real seems to us in the first instance to be parti- ular. Everything real is thought of as entering experience n its particularity ; it is this or that. Yet the reality of ny particular thing consists in its relations to other things, nd apart from these relations there is no content of know- edge, and if there is no content there is no knowledge. Without relations particulars would be momentary experi- nce. They would have thisness without whatness. The

whatness or content of the things which we experience as particulars is their universality. Universals are concepts. It is easy to see therefore that every attempt of the mind to discover the reality implied in our experience supposes the use of concepts, and these concepts are not merely substitutes for percepts where perception is impossible, they are totally different in kind from percepts. It is one and the same reality that we know as particular and as universal, but particulars are not universals nor are universals particulars. The men and women I know are particular men and women, but their reality as men and women is their human nature. Human nature, mankind, humanity, are universals, concepts.

In our everyday experience, then, we distinguish two kinds of knowledge—the knowledge which comes from sense experience and the knowledge which comes from thinking and understanding. The first kind seems wholly composed of percepts and its objects are particular sensible things. The second kind is composed of concepts and its objects are things in general or universals, that is to say, not particular things themselves but the nature of things. It is because we have in ordinary life this other form of knowledge, the concept, that our experience is not the patchwork of sensations,—colour blobs and splashes, noises, touches, warmth, colours, pains,—into which experience seems on analysis to resolve itself.

When we go behind the knowledge which serves us in our ordinary experience and consider the systematic knowledge which we distinguish as science, the contrast is even more striking. All the objects in science are concepts, and these concepts are not only directly related by us to our percepts, to the particular things which we actually experience, but also the mind gives these concepts a special perceptual form which is not actual but imaginative. Thus the sun which is an object of knowledge in the science of astronomy is perceived as a disk in the sky illuminating our world and warming our earth. Yet the sensations of light and heat are no part whatever of the scientific object as we conceive it, and, moreover, the concepts of light

and heat as scientific reality have nothing in common with the sensations we feel. The kinetic theory of gas, which expresses in a scientific concept the reality we sense as heat, is not made comprehensible by comparing, for example, our feelings of warmth in the sun and of coolness in the shade. And yet that kinetic theory itself requires perceptual form in order that it may be expressed at all, but it is a perceptual form which can only be imagined actual, it can never be actual.

This fact that physical science depends on concepts was, as we saw in the last chapter, one of the guiding principles in the philosophy of Kant. One of the questions he set himself to answer was, how is physical science possible? Kant thought of concepts as being few in number, purely abstract, formal, not material, factors in the constitution of knowledge, their essential function being to unify experience. The concepts are the principles of unity, the laws of nature, and guided by the formal or Aristotelian logic we are able to deduce the complete list of them. This is the famous transcendental deduction of all the pure forms of experience or categories of the understanding. Kant represented these concepts as preformed receptacles which the mind itself brought to experience. The activity of the mind in experience consisted in imposing on the multitudinous impressions of sense pre-existing forms, and to be able to do this was the condition of knowledge. The mind has a formative power over a matter of which it is the passive recipient.

The concept, therefore, as Kant presented it, is universal, not particular, it is a necessary constituent of experience, and its condition, but it is abstract. It is pure form indifferent to content. The mind possesses it as the condition and as the form of its experience. But mind is thing-in-itself and therefore unknowable, and the content of experience, the sense manifold, also requires for its support the existence of things-in-themselves which are unknowable. The very conditions of experience make knowledge of reality unattainable. The dualism of form and matter give rise to the distinction between phenomena and noumena.

Yet Kant's theory marks a great advance. In making the contradiction in the concept explicit, he pointed the direction in which the solution of the problem lay. The *a priori* synthesis implies an original activity in experience. Kant himself demonstrated this in the instance of the mathematical concepts. More than this, the priority of the synthesis implies that the duality of the concurrent terms has its origin in the act of knowing, and that the act of knowing is not the effect or issue or result of an original duality. It led to Hegel's great discovery.

I will state this first of all as briefly and categorically as I can. In doing so it will be easier if I separate the logical and the metaphysical theory although they are intimately connected. The first is the dialectic, the second is the concrete universal. The metaphysical concept follows from the nature of logic. The object of thought is not presupposed in thinking, it is posited in and by the act of thinking. The concept is activity of thought. It is not abstract, it is not a mere form superimposed by a contemplative mind on an alien matter, it is the concrete, universal, necessary, reality which thinking brings to existence. The logic is the thinking, the reality is the thought which thinking creates. Literally, therefore, and without any allegorical meaning, we may say that there is nothing either good or bad, but thinking makes it so.

Logic now acquires new meaning. It is not a syllogistic process, but dialectic. It is not a set of rules for the formal test of correct reasoning. It is the science of the actual process of the mind in the development or unfolding of its active life. Once the concept of mind as essential activity is grasped, and nothing short of this is implied in the *a priori* synthesis, and the whole scope and meaning of philosophy is transformed. It was no arbitrary speculation, no superficial or fanciful conceit which produced the new logic of philosophy, it was profound insight into the nature of reality. A living activity is self-objectifying. The grades or stages of its evolution are the moments of its life. The moments of its life are not external divisions of an indifferent content, they are distinct attainments with a character

they derive from the continuous process of the activity. The logic of philosophy is the science of self-objectifying mind.

The dialectic is the scheme of this conscious activity as it reveals itself to philosophical analysis. Thinking is in the first instance affirmation. It predicates being. Every affirmation is at the same time negation. It predicates being by setting over against itself non-being. The affirmation can only gain content *pari passu* with its negation. Hence the activity of thought is an opposition within thought and a continual coming and going between what is affirmed and what is denied. Opposition is the very essence of activity. Instead of nullifying the activity, it is its spur and incentive. It is on the holding together of opposite factors, factors which in pure abstraction are identical and simply nullify each other, that the synthesis of reality depends. It consists in an equilibrium continually disturbed and automatically restored. In affirming we also deny, but the negation which the affirmation posits does not remain simply nothing, purely abstract non-being, its very positing endows it with content, and the negation becomes an opposite or contradictory reality which sets up an equal claim to content against the affirmation. I cannot affirm " I am " without in the very thought distinguishing a not-me from the me, and this not-me in the very affirmation of the me asserts itself as existing.

The well-known illustration of this is Hegel's first category. It may be truly described as the introduction to metaphysical intuition. Take our existence, the existence we know in experience without any mediated knowledge, and reflect on what it is. In its simplest expression it is becoming. We never are, we are always becoming. Apart from the particular feeling, knowing, or desiring, which gives tone or content to our passing mood, and forms our character, there is the continual flowing, the ceaseless change which makes each moment of experience not a repetition but new existence. Reflect, then, on this becoming. What is it? It is not a simple experience. On the contrary, it seems on analysis to dissolve only too easily into factors.

It is a relation, but a relation of terms internal to it. It is a synthesis, but of what? Here is the amazing discovery. The factors of becoming are being and non-being, is and is not, existence and nought. But do not these factors take us then beneath the synthesis? Do they not, in fact, give us a more fundamental reality than the becoming which we took to be the simplest expression of our existence? No; for when we abstract these factors from their relation of opposition in the synthesis they are meaningless. What in itself is pure abstract being? It is nothing,—nothing which is identical with being and not merely a term for our ignorance. And what is non-being? It is not even negation until we provide it with the content which its opposition to being offers. Being and nothing are not, then, self-subsisting realities, they are factors in the only thing that is real, becoming. The simplest reality we can bring before our mind, then, is a synthesis. The reality of this synthesis does not lie in the content or substance of its terms, but in the activity, the actual passing to and fro from thesis to antithesis, from antithesis to thesis, holding the factors together and keeping them apart.

This philosophical principle conforms exactly with the modern scientific concept of the basis of physical reality. The fundamental concept of science is the field of force. It is more fundamental than the concepts of matter and energy, for it is the condition of them. A field of force is essentially the concept of opposites kept apart and held together in stable equilibrium. Suppress the activity in this opposition and the factors are not residual, they are nullified and disappear. In the older concept matter was primarily adverse occupancy of space. This seemed to depend on two essential attributes, mass and impenetrability. Both have lost their absolute meaning in modern theory. Given a moving particle, however small, and a range of circumscribed movements, however large, and relatively to some possible system, there is mass and impenetrability. But the particle,—have we not in this an ultimate factor which will provide us with a material basis of our universe? It is not so; in physical science

the particle is introduced *ad hoc*. It is clear that whatever holds true of the mass and impenetrability which the particle by its motion generates, is equally true of the mass and impenetrability the particle itself possesses. So not the particle but the electric charge is the unit of physical science, and what is the electric charge but a synthesis of opposites, a polarization of attractive and repellent forces? In physics then, as in metaphysics, the ultimate concept of reality is activity. Suppress the activity and there is no residuum, there is nought.

The concrete universal is the view of the nature of reality, or, what is the same thing, the concept of the reality of nature, which follows from the discovery of the dialectic. That is to say, the dialectic reveals to us the constitution of the world by giving us the principle from which we are able to deduce the character of thinghood. The dialectic, the process or act of thinking, is itself dialectical, for thinking posits and does not presuppose thought. Thought is the negation of thinking. Thought is the fact opposed to thinking which is act.

Universality and concreteness are the characters which we attribute to reality whatever be our theory of the nature of the material universe. The objects we recognize are universal objects: they exist for every intelligent observer; they are for each absolutely what they are for any one. Were they not, did we mean no more by the thing thought than the actual sense-awareness of the particular thinker, there would be no recognition of objects. Whether we hold the view of unsophisticated common sense that the real world is unaffected in its existence by any activity we may put forth in knowing it, or whether we hold the view which in some form has been that of philosophers in all ages that unity of existence of knower and known is posited in the very affirmation of knowledge, in either case the objects recognized in knowledge are universal objects, identical for all knowers.

The objects we recognize are also concrete. They have a stubborn nature of their own which asserts itself against us and refuses to yield to any creative or annihilative power

our mind may claim to possess. Objects are not like the spirits which we call from the vasty deep and dismiss as soon as our business with them is over. The notion is still widely held, notwithstanding a century of commentators on Hegel, that the Hegelian philosophy means the affirmation of a power in thinking to produce the real, or at least that the reality of any object is simply a deduction from the thinking it. There is no more unpardonable misunderstanding than this absurdity. To some extent Hegel is himself, no doubt, to blame for it, for he always treated the misunderstanding with a certain contempt, and disdained explanation on the common-sense level. He gave the impression of revelling in paradox. It is a clear necessity of conscious existence as we experience it, that in whatever way our world has been generated and whatever be the nature of the opposition of world and mind, this opposition exists. Objects are alien, independent of and indifferent to the mind which knows them. This independence of the object is a problem of philosophy which is not solved either by assuming it in the manner of common sense or by denying it in the manner of Christian Science.

In the case of a vast number of the objects their ultimate dependence on a spiritual principle is indisputable. There are objects, that is to say, recognized as possessing full objectivity which in being known are posited as existing, and whose reality is identical with knowledge. Objects which concern social and political relations are of this kind. No one would deny, for example, objectivity, in the full meaning of the word, to such things as a lecture, a ball, a public meeting, a boat-race, the Derby, a cricket match. These denote each a class of objects, but each object of the class is particular and individual and independent of the knower. In regard to all such objects we should, if challenged, admit that we suppose a material basis of their reality, however much we may neglect the materiality in discourse, but as objects they owe nothing whatever of their real character, nothing of their essential objectivity, to this basis, and we should be hard put to it to define the relation of the material to the object. In a general way,

indeed, we assume that were there no material substance there would be no world, but in the case of these objects it is clear that their substance is wholly mental. They could have no existence in a world without mind. Now in regard to such objects the Hegelian dialectic is easy to demonstrate, and Hegel's works are simply crammed with such demonstrations. Let us take a very obvious example, a game. A game of golf or cricket, or a game of chess, or even a game of patience, is a reality as crisply objectified as any simple physico-chemical object. What then is a game? In its primary intention a game is a diversion, a relaxation, and a game is therefore in the first instance the purely negative need of relaxation in some sustained effort. But relaxation cannot be satisfied with pure idleness, thought therefore gives shape and form to an opposite task. The essence of the opposition is the diversion from and relaxation of the tension of some serious business. But in the very passage into this negative position we make a new affirmation, and we find in the very process itself a new positive task shaping itself and asserting itself as equally serious. As the process develops, the new task changes from diversion into serious business, till in the end the gáme is no longer play and ceases to be diverting. We see this process on the large scale in the curious development of games in the public school and university curriculum, and in the perfect antithesis of the original intention in the rise of the professional player. The scheme of this objectification is manifest. It is only in its opposition to some serious intellectual task that the game is a game, and it is only so far as the seriousness to which it was opposed passes over into it and becomes identical with it that it acquires the shape and form which objectivity demands, and finally it is only in so far as the opposition is maintained in constant equilibrium of attraction and repulsion that the essential concreteness of objectivity is secured.

Here, however, we come to a crucial point. Let us suppose it admitted that thinking is objectified into thought by this dialectical process, yet it will be said thinking is

throughout passive towards the material of the object and only active in shaping the material. Suppose our game to be golf, we may admit that there would be no golf were there no mind and no thinking, but equally there could be no golf without balls, clubs and a certain configuration of the golf ground. Given any kind of stuff and the mind has the wherewithal upon which to set to work, but the one thing mind cannot do is to produce, or deduce out of its own activity, the matter on which that activity is exercised. It is on this obvious fact that naturalism bases its argument, and it is this fact rather than any argument that commends naturalism to common sense and scientific understanding. The dialectic shows us that this antithesis between matter and form is unreal. In this was the great advance which Hegel made on the position of Kant, for it was the perception of the inseparability of form and matter which led to the rejection of formal logic and the discovery of real logic, the logic of philosophy.

Let us return to the example of the game of golf. The matter of the game is given, the form is imposed, but the given matter is not formlessness. It is not matter in its own right, but only in virtue of the form already imposed on it. As material of the object, the game of golf, it is taken *ad hoc*, but even so its materiality is not absolute, pure and in its own right. That this is so is evident when we start to analyse this matter. We can never succeed in divesting it of form so as to be left with pure stuff formless and decomposable no further. To analyse it is simply to follow its history backwards or forwards. At every stage what there is, is not something separable into matter and form, but always a distinction between what Spinoza, in one of his splendid intuitions, described as *natura naturans* and *natura naturata*.

In considering the objectivity of nature, this is the clue which philosophy offers us. It may not be easy, in the case of any object whatever, at once to show convincingly the thesis and antithesis and the dialectic movement and its reconciling synthesis in which the concreteness of the object lies, but at least the vulgar notion that this concrete-

ness consists in a materiality which is self-subsistent and independent of form is exposed in all its absurdity.

Let me now try by comparing the materialist and idealist concepts of the world to show the impelling force of the philosophical principle in its striving for intellectual satisfaction. When I set aside every emotional aspect of the problem, religious or mystical, and confine myself to the purely intellectual aspect, viewing nature as the scientific inquirer views it, the idealist principle seems to me to succeed where the materialist principle fails.

The whole of human life, and the whole phenomenon of life out of which the human mode of existence is evolved, depends on conditions which we conceive as in themselves totally indifferent to the life which they condition. The immediate aspect of these conditions is that of states of masses of matter in motion, an aspect which on analysis tends to become the extensive occupation of a space or void, by a discrete material undergoing mechanical change consequent upon successive alterations of position in time. Let us raise no difficulties in regard to the concepts of space, time, matter and movement, but accept them at least as descriptive of the reality which is not living but the condition of there being life. Life is then an almost insignificant phenomenon, so disproportionate is it to the immensity and infinity of the non-living conditions of it. It is not attributable to chance because chance has no place in scientific thought, but the necessity which underlies the emergence of life is purely mechanical, and though from the human standpoint life is the all-absorbing centre of interest, everything seems to point to its almost negligible significance from the standpoint of the world-view. Life depends in the last resort on the instability of the compounds of a certain particular chemical element, carbon, and this activity is dependent on physical conditions which can only have arisen at what is practically a momentary stage in the history of the evolution of a planet, an infinitesimal stage when considered in relation to the whole history of the planet. On this planet life is possible only on one particular plane of its spherical mass, and the

duration of the conditions which have determined this possibility, however agelong it appears to our human interest, is infinitesimal in relation to the vast duration which must have preceded and must succeed it. When we look beyond our earth and consider in the boundless universe the infinite possibilities of other spheres, then again what impresses us is the vast expanse, and the myriad masses of matter within it, in none of which is it possible that anything at all resembling life as we experience it can exist. In our solar system there are only two planets besides our own which suggest to us the remote possibility that something in some way resembling the conditions of life may exist in them or that the history of this planet may have analogies in the history of planets in other systems.

Materialism recognizes without attempting to conceal the problem of the nature of life and consciousness, and it does not minimize the difficulties of conceiving an origin of life from non-living matter. We have no experience of any chemical combinations out of which vital phenomena are induced or arise spontaneously. We are forced to the conclusion that, at least so far as any known form of living organism is concerned, life and consciousness has had a single origin at one definite historical period. There is, so to speak, blood-relationship between every species or genus of living thing,—animal, vegetable, microbial. There is absolute continuity of generation between every living individual and the primal individual form in which life appeared. This makes the problem of life a very difficult one in science. But allowing for this difficulty, the materialist view, resting on the fact that life and consciousness depend on non-vital physical conditions, and insisting on the prior independent existence of those conditions, is, that life has arisen out of those conditions though the mode and nature of its origin may be undiscoverable, and that the conditions are destined to continue their history though life and consciousness cease to exist.

Modern idealism is not an attempt to disparage the strength or cogency of the concept of nature as an inde-

pendent and alien reality, for this aspect of nature is as essential to idealism as it is to materialism, though not uncritically accepted by it as fact. It is a popular and general misconception of idealism that it reduces nature to mind and deduces existence from thought. It is the persistent misconception of idealism which makes the difficulty of presenting it as a rational theory. I will try, therefore, not merely to state the doctrine but to illustrate it with scientific examples. Science teaches us that our world is moving in relation to the heavenly bodies with a prodigious velocity when compared with any movements of translation which we can be conscious of in our experience. Science also teaches us that the elements which condition our existence, —the air we breathe, the earth we walk upon,—are exercising upon us a continual pressure or weight, of which we are unconscious but which is enormous as compared with the weights we measure in scales. Not only are we absolutely unconscious of this movement and weight, but it is part of our nature and a condition of our existence that we should be unable to be conscious of it. We have only to imagine an individual organized like ourselves, but consciously experiencing these movements and weights as actual sensations, to see that such a one would be totally unfitted even for a single instant to exert or maintain the human form of activity. It is clearly then an *a priori* condition of human life and consciousness that the individual should suppose the earth at rest, the ground beneath him firm, the sky above him open and free. In precisely the same way idealism shows that it is an indispensable and absolute condition of living and conscious activity that things thought of should present themselves as independent of, prior in existence to, and alien in reality from, thinking. It is the condition of thinking that object thought should present itself and confront the mind as pre-existing cause,—not merely that it should appear to the mind as such but that it should exist for the mind as such. This is the meaning of the dialectic, and to fail to see it is to miss the true discovery which it claims to have made. The ego in affirming itself posits the non-ego,—not a sham or dummy

appearance, not a shadow of itself. The non-ego is the negation of the ego, but there is no falsity in the negation. If there be no non-ego, no non-ego in its own right, then also there is no ego. In the logic of thought, the logic which shows us the real and not the merely formal movement of thought, the moment of nature is when nature is affirmed with its own positive content. Suppose it possible that nature could appear as immediately identical with the consciousness of it or with thinking about it, in the manner which the solipsist argument declares to be reality, then so far from affording an illustration of the Hegelian dialectic it would destroy it. There would be no dialectic, for it would be lost in a single self-identity. Nature is the immediate negation of the ego, and the ego cannot posit or affirm itself without in the same act positing and affirming the negation. The negation is not pure nought, it is posited, and therefore opposition. The movement of thought is the passing over into this opposition and the discovery that in this difference there is identity. The concrete reality of life and mind is then seen to consist not in the passing to and fro from affirmation to negation, from negation to affirmation, from thesis to antithesis, from antithesis to thesis, but in the synthesis of a pure act which holds together at the same time that it holds apart, the distinct factors of reality. This, as I apprehend it and accept it, is the philosophical doctrine of the concrete universal.

The theory of idealism is not, then, that a subject, supposed already existing, by thinking produces thought,—as a spider spins a web from its own tissues,—and then proceeds to endow its thoughts with objective reality. The theory is that reality is activity, and that activity manifests itself in a primary and necessary antithesis,—the antithesis thinking-thought, subject-object, act-deed. The conditions of our finite individuality and the nature of our activity require that our outlook on reality shall be in the moment when the antithesis is complete, when mind and nature are absolute in their opposition. The activity of thought, the necessity of a continual attention

to life, the need to act unceasingly from moment to moment, binds the mind to the observation of nature, directs it outward, prevents it looking back or within on its own activity. Nature appears, therefore, as a hostile opposing force confronting life and mind and indifferent to them. The philosophical theory of idealism is a discovery and a constructive theory based on discovery. The discovery is that in nature mind finds itself; the constructive theory is that the original synthesis is mind in its undifferentiated unity as activity, and that the process of this activity opposes a new negation to every position it attains.

The principle of idealism is, therefore, that the complete world-view never does and never can appear immediately and simply reveal its reality to the discerning mind of the finite individual, just because his finitude means that he is actively participating in the world process he seeks to understand. Idealism declares that it is possible to construct the world-view by attending to and interpreting the activity itself.

To sum up: the concrete universal is the formulation in logical terms of the philosophical doctrine of the nature of the reality of the world. It describes the factors and their relation which constitute for *knowing* the objectivity of nature, and for *being* the possibility of knowledge. It is not an arbitrary or ingenious hazarded hypothesis, it follows from the perception of the mode of the activity of mind. The mind in the first moment of its conscious activity finds an independent alien reality confronting it, a reality which it possesses the power of contemplating and finally of understanding. In knowing nature mind finds itself, and the logical process is seen to be the discerning of identity in difference. This is held to imply an original synthesis, logically prior to experience and the condition of its possibility. The concrete universal is the concept of the mode of working of that synthesis.

Concreteness is the character of thinghood. The concrete universal means that reality in the full meaning of the word is of the nature of the concept. In the concept, opposite antithetical factors are held together in and by

the continuous synthetic act of thought. The factors in themselves are purely abstract ; only their synthesis in the concept is concrete.

Universality means that the whole is present in every part. The universality of a finite individual human being, for example, is not the number of his abstract, external, resemblances to other individuals, by means of which the group man is classified. It is the humanity or the complete human nature which exists in every man. There is no core round which qualities cluster or to which properties are adherent.

There are two alternatives to the theory of the concept as concrete universal. One is materialism, the affirmation of infinite and absolute space, time, and stuff, as the primordial conditions of all diversity and variability, including mind. This primordial reality may be conceived as in itself inert, —matter ; or, as essentially active,—energy or force. The other is solipsism, the denial to the individual mind of the possibility of transcending its own state of consciousness. Both are blind alleys. It is only in the concept of the monad that the concrete universal is both realized and individualized.

CHAPTER XIII

CREATIVE EVOLUTION

Before the beginning of years
    There came to the making of man
Time, with a gift of tears;
    Grief, with a glass that ran;
Pleasure, with pain for leaven;
    Summer, with flowers that fell;
Remembrance, fallen from heaven,
    And madness risen from hell;
Strength without hands to smite;
    Love that endures for a breath;
Night, the shadow of light,
    And life, the shadow of death.

SWINBURNE.

IF we accept the principle of the Hegelian dialectic, then, apart altogether from any particular world-view or from any arbitrarily developed system, we are able to conceive, and to see why we are able to conceive, reality as activity. We see that matter is in the first moment of its presentation to consciousness, whatever positive character it may afterwards acquire, essentially negative. We cannot set out from pure negation. Negation in itself affords no foothold, no starting ground from which any process, logical or alogical, can push off. We may indeed conceive the creation of the world from nothing, meaning by nothing non-pre-existing matter and form, if we posit a creator within whom the being and the non-being are synthesized. It is a simple impossibility of thought to conceive God as arising from nothing, or rather to conceive non-being as a distinct and unconditioned moment of God. This seems to me the great truth expressed in the ontological argument. We must

start with affirmation if advance through negation is to be possible; we cannot start from pure nought.

It is evident, however, that in this we are confronted with a profound problem. We cannot eliminate negation from thought at any moment of the process of thinking, and yet negation can be neither the starting-point nor the resting place. Thus we have an antinomy in the very concept of ultimate reality. Reality affirms itself and cannot deny itself; yet also reality can only affirm itself in so far as it negates itself by affirming its opposite. Opposition is in the very nature of the concept, and thought cannot transcend the concept.

There is no nothing and creation is fact. Reality is not inert stuff, it is a becoming, the continuous upspringing of what is new, what is unforeseen and unforeseeable. This is the concept of life as creative evolution. Its formulation marks a new and great advance in philosophy. We owe it to our contemporary philosopher, Bergson. It brings intelligible unity into the concept of God and the world.

The biological problem, the nature and origin of life, is familiar to us in the progressive research of the last half-century. It presents the problem of philosophy in the most concrete form, and at the same time it puts us in possession of the key to its solution. Life in its strictly biological meaning is a twofold problem, a problem of nature and a problem of genesis. Every living creature has a material basis of its existence, and this material basis is a simple structural design comparatively easy to comprehend as compared with the extraordinary complexity of function which it develops. Any particular individual organism may be traced from its condition in which it appears almost structureless, apparently homogeneous, and exceedingly minute, a speck of stuff we name protoplasm. We can follow the stages of its growing complexity and mark what seem to be absolute moments in the emergence of its various functional activities. There seems a limit of absolute simplicity in its origin, an integration of infinitely complex and diversified functions in its maturity, and when its functions end in the state we call death,

the structure disintegrates but the stuff remains. When, further, we study the material basis itself, it seems wholly unaffected by the temporary function or functions it has subserved. This is one aspect of the biological problem. There is another.

Every living individual form is the product of an evolution which appears indifferent to the material basis of the organism and only to affect its form and function. To this form and function we can assign no material origin. The evolution which has determined the mode of any individual activity is definite, continuous. The moments we may find it convenient to mark off in it as stages in its history are external and arbitrary. We can assign no moment as that of its birth or death, nor can we understand how it has arisen. We can neither induce the living out of the inert nor conceive the conditions under which at any specified moment the evolution of life had an absolute beginning. We speak indeed of evolution as a great expansion of life, quantitative and qualitative, from simple beginnings. "From the amoeba to man" is our expression of this fact. But the slightest philosophical reflexion convinces us that the concept of an amoeba with the potentiality of a man cannot be the concept of the amoeba as an infinitesimal speck of undifferentiated jelly endowed with active integrative form.

Moreover, when we consider life in either of these aspects, in its individual form or in its evolution, our thinking requires the creation of special concepts for its comprehension, the concepts of physics and chemistry being completely irrelevant. The fact that they enter into living organisms does not affect in any way the atoms with their positive nuclei and planetary electrons or even the molecules with their stable combinations. It is true indeed that the material basis of life seems to be conditioned by the instability of carbon compounds, but neither carbon nor any of its compounds is changed in its nature by life, it is only affected in its disposition. The attempt has indeed been made by those who are fascinated with the idea of mechanistic interpretation to dissect and separate out individual

characters and transmitted tendencies, to trace their origin in the germ, and to assign to each a distinct and definite material possessor. The vital elements have been named "ids," and it has been sought to appropriate each "id" to an individual material constituent of the germ. It was discovered, however, that even if it were sufficient to assign to each "id" only a single atom there would not be enough atoms to go round. It is in quite another direction that the solution of the problem of life is to be sought.

With regard to the mechanistic hypothesis of the continuity of inert and living matter, we may, so far as our present standpoint is concerned, content ourselves with the plain fact, which no one disputes, that the sciences of matter,—physics and chemistry,—of themselves offer no interpretation of life, and their problems are not in any aspect of them relevant to the problems of the sciences of biology and psychology. There is no direct passage from the mathematical and physical sciences to the biological.

Life is a mode of behaviour *sui generis*. A living thing behaves in a different mode, in every minutest particular, and on a different principle from any mechanical combination of elements brought together by external agency. There is not one single mode of living activity, there are many; but whatever classification we adopt all are variations of a unique principle. This principle is best described by the term consciousness, though consciousness in any actual living form may rarely attain the special state of self-consciousness which is the archetype. Life therefore presents a profound metaphysical problem, for consciousness is an immaterial force. Now we are unable by our very mental constitution to represent or imagine any activity without a material substratum. Activity conceived as in itself, as unsupported, —in the air, as it were,—detached from anything palpable to sense or expressible in imagery, is a pure abstraction lacking the essential quality of reality. We speak indeed of spiritual forces, of the potency of ideas, but we always tacitly imply the material manifestations in which they find expression. "Strength without hands to smite" may

pass as a beautiful poetical fancy, it may even serve an abstract logical analysis of ideas, but if we try to translate it into concrete experience it lacks the embodiment which even pure imagination requires for its expression. And yet this poetical image expresses literally the life-force or mind-energy which we know in daily experience and study in the biological and psychological sciences. It was the perception that the substance of the mind is not material like the substance of the body which led Descartes to distinguish two substances, one whose essential attribute was thinking, another whose essential attribute was extension.

A metaphysical problem is presented then in the very fact of life, and we may state it briefly and in its broad outline as follows: Life can only be interpreted by positing a substance which is not material and a cause which is not mechanical. The alternatives therefore are (1) that there are two substances, and two causal principles, mutually exclusive in their essential attributes and in their modes, equally self-subsistent and yet mutually related; (2) that there is one substance and one causal principle, essentially simple, and that this substance possesses the infinite capability of attaining complexity of form by mechanical disposition, and that the highest mode of the activity of this substance differs from the lowliest only in degree; (3) that life or consciousness is the one substance, that it is a creative activity, that matter is an aspect or view coincident with and dependent on intellect, which is a mode of the activity, and that intellect and matter are correlative and the product of creative evolution.

It is this third alternative which is the theory of creative evolution, and I propose now to examine its metaphysical ground.

A material object, whatever be the general form of it,—gaseous, liquid or solid,—is determined as to its particular form at any and at every moment of its existence by the distribution of matter in space at that moment. The distribution of matter at any moment and therefore the configuration of an object at such moment is determined externally for the object by the movements of the

constituents of the universe previously to and continuously up to that moment. Space and time are therefore essential formal conditions of the concept of a material object, but not in the same degree, for while space is intimately part of the concept, and mathematically speaking a constant, time is both independent and variable. Space is necessary to the concept of matter, time to the concept of movement, and both matter and movement are necessary to the concept of a physical object. It was this which led Descartes to the definition of material substance as extension, and it gave meaning to the mechanistic theory he expressed in saying, " Give me matter and movement and I will create a world." To know how a material object behaves, placed in any particular situation, we have to know the actual spatial distribution at the moment. That and that alone determines it. Whatever movements are in being at any moment, the mechanical object will respond to the external compulsion brought to bear on it, and any doubt we may have as to the behaviour of such an object is purely due to ignorance of these external conditions. In other words, the forces which determine it are then present and existent, and no forces then non-existent are acting upon it.

The characteristic mark of the behaviour of a living object is the direct opposite. At every moment it is determined by forces acting from within and not from without. If we knew exhaustively the distribution of matter at a given moment we could not deduce from that the living response. So long as an object is living it maintains its form by a force inwardly exerted and inwardly adapted to the external situation. But the essential thing is that the force of which it disposes and the behaviour which expresses that force are not existent in the universe either within or without the spatial boundaries of the living object. This is as true of the lowliest living object, plant or protozoan, as it is of the most highly organized and specialized creature. The springs of its activity which determine the form of its response to external influences, lie in the non-existent past, and so far as they are present and actual must be referred to an immaterial non-spatial reality, a

spiritual substance which cannot be discovered by analysis of experience, external or internal, and cannot be included in any inventory we can make of the entities which constitute the spatial universe.

Spiritual substance, if we adopt the expression to indicate whatever the reality may be which underlies the nature of living beings, is the antithesis of material substance in this, that while a material object is wholly determined by its spatial and temporal conditions the living being is neither spatially nor temporally conditioned. The activity of life is displayed in space, the evolution of life is displayed in time, but the concept of life is not dependent on the space and time which condition the display of its activity. The spatial and temporal conditions which apply to every particular living creature,—plant, insect, man,—apply to it solely in so far as it is material object, and have no reference to the plant-nature, insect-nature, human-nature of which it is the individual expression.

In the same way if we consider the metaphysical concept of cause we find that, as in the case of substance, the principle which we apply to the energetical system of physics will not comprehend nor interpret the processes of life. Spiritual activity requires the formulation of an energetical principle completely antithetical in its mode to that of physics. The most general characteristic of the spiritual principle is integration. Life is a whole acting as a whole, and not the mechanical whole of a composite or aggregate of self-subsisting parts. Life means that there is more in the present and acting than is comprehended in the physical constituents spatially disposed at that present. Consider for example such a simple illustration as that afforded by the hardy-annuals whose seeds we sow in our gardens in the spring. The whole energy of any one of these plants is concentrated in and adjusted to and exhausted in the production during the short warm summer season of seeds which will resist the winter cold and await the time of germination in the following spring. The most curious and complex and, speaking metaphorically, ingenious contrivances are brought to subserve this purpose,

and at every stage of the life process we may stop and admire the adaptation of means to ends in the disposition of the material affected by purely physical forces. But what mechanical principle of efficient causation will include the non-existent past and the non-existent future which enter as present factors into this living activity? Physical forces account for the disposition at any moment of the physical constituents, but what accounts for the non-existent physical conditions, the anticipated winter temperature and succeeding spring warmth and light which determine that present disposition?

Life then transcends matter in the meaning that it brings into play principles which cannot be comprehended within any exhaustive aggregation of physical constituents. Nevertheless, however predominant the spiritual principle in living activity, and however antithetical in its nature to the material principle, yet we have to admit that life is bound to matter, that it is never experienced and cannot be conceived in separation from material existence, while on the other hand matter is easily and indeed familiarly conceived, and appears to be actually experienced, in separation from life. Regarded from the standpoint of philosophy there can be no reasonable doubt that existentially life and matter are one. The materialist affirms it and the idealist cannot consistently deny it. Idealism is generally associated with the denial of existence to matter and the reduction of matter to a mere mode of mind. With this form of subjectivism I am not here concerned. From the standpoint of physics and biology and psychology we are bound to admit that life is existentially one with matter, and we are not bound to admit the converse. It is no doubt for this reason that we find ourselves by nature disposed to accept the hypothesis of materialism that there is a hierarchy of the forms of existence, starting with simple stuff, simpler we think than any form of object known to us, rising continually by an inherent force, developing, as it grows, the immense variety and diversity of the living forms. So natural does this seem that the progression from the simple to the complex is proclaimed as the obvious fact of existence,

and therefore the model to which scientific method should conform.

The theory of the evolution of life, as it has been presented by science in the hypothesis of natural selection and other scientific hypotheses, has always been based on the more or less unconscious assumption that it is possible to pass from the simple to the complex, from homogeneity to heterogeneity, by direct, real progression, that this accords with an innate logical principle, and that therefore there is no inconceivability or irrationality in the thought, as there is no improbability in the fact, that the living has arisen from the non-living. Herbert Spencer accepted the principle uncritically in philosophy. It is admitted that we have not discovered,—it may even be thought unlikely we shall ever discover,—the actual links of the progression, but no consciousness of essential irrationality disturbs the conviction that it is at least possible, indeed overwhelmingly probable, that it is fact.

The theory of creative evolution strikes right athwart this easily accepted presupposition. It defends itself by purely scientific arguments, arguments based on the facts of biology and psychology, but it starts by challenging the rationality of the ordinary scientific assumption. Life is the primary and original fact, matter is the dead product it casts off. The concept of matter is reached by way of diminution. It is less than life. The derivation of life from matter implies the origin of something from nothing, an irrational concept. Just as in the case of the Hegelian dialectic the principle is seen with the greatest clearness in the barest category, so here the principle is most manifest when we compare the notions of inertia and activity. Given the concept of the inert, by what process of thought is it possible to deduce the concept of activity? How can an essentially static reality of itself produce in itself movement and change? Clearly it cannot. Movement and change must be imposed from without, and by the hypothesis there is no without. But the converse is not true. From activity, from change, from movement, we can deduce the concept of the inert, the changeless, the static. We obtain them

not by adding something to the reality but by diminution, —by arrest, by framing, by inhibiting, by shutting out of consciousness, by selecting. The product we thus obtain is not simpler and more elementary, still less is it the original constituent. It is arbitrary and relative. Such in the theory of creative evolution is matter.

The metaphysical doctrine on which the theory of creative evolution is based is then that the concept of matter is reached by diminution. To speak in allegory, matter is the dead shell which life casts off. Matter is less than life, and it cannot be conceived as potentially holding life, for that is to conceive it as more than life. If the metaphysics implied in a scientific theory is bad the science itself is insecure. The bad metaphysics of naturalism is the assumption that the intellect is absolute. The intellect is accepted uncritically as being what it directly purports to be, —the characteristic activity of a mind which contemplates, and which in pure contemplation finds revealed to it, the nature of an independently existing reality unaffected by any relation in which it stands to the mind aware of it. In opposition to this metaphysics the theory of creative evolution affirms that the human intellect is as completely a product of the evolution of life as any mode of conscious or unconscious activity realized in living beings from the lowliest to the most exalted in the scale. And moreover, it discovers that the intellect has not for its purpose the revelation to us of theoretical truth, its purpose is, consistently with what we may observe throughout the whole range, severely practical. It serves our activity by restricting our outlook. It defines our actions as they are forming themselves. It gives efficiency to our actions by confining the human mode of existence to a particular circumscribed range of activity. Intellect and matter are correlative, generated by one and the same force—creative evolution. Intellect imposes on life the static form of matter, and life assumes to intellect the aspect of fixity.

Before I try to show the support this philosophical theory derives from science, and the light it throws on scientific

problems, let me try and put in clear and unmistakable terms the metaphysical issue.

The theory of naturalism is that objective reality rests on a concept of things-in-themselves. It postulates beneath the phenomenal form which the object may assume to any conscious apprehension of it a real object indifferent to the relation in which it stands to the mind knowing it. It is a postulate which seems called for and justified as the only alternative to a self-stultifying subjectivism. This thing-in-itself is taken as the basis of objectivity and as the underlying unity of all the various and diverse modes of apprehension which may exist. For example, a man, an ox, a hawk, a beetle, may be together in a particular environment, each will apprehend in a different manner and with a different interest, but it is from one absolute indifferent objective universe that each will select.

The direct converse of this is the theory of monads. It rejects the postulate that there is or can be an absolute system of reference, an objective universe as thing-in-itself. It rejects the postulate not merely because it is otiose but because it is irrational. What then is the converse metaphysical concept of the absolute? It starts from the indissoluble unity of subject and object, of knower and known. Its absolute therefore is the individual subject of experience. How then does it avoid the impasse of solipsism? Individuals are mutually exclusive, if objects are inseparably united to subjects there can be no transcending the individual. The individual will comprehend all existence. The answer is that no individual living being is circumscribed in its nature by the limits of its existence, nor confined within the time and space boundaries of the actual exercise of its activity. Each individual when we compare his life with his nature is but as the bud of a tree, part and manifestation and representative of a larger whole. Each species is likewise part and expression of an activity of life. In the finite individual we do not see the whole individuality, it transcends itself in activity as a whole. It becomes the concept of life or mind.

What advantage then do we claim for this metaphysical

concept over that of naturalism? In the first place we do not postulate reality, we indicate it. The reality we indicate transcends the limitations of our finite individuality, but it does not and cannot transcend the nature of which an individual is the expression. There is no gulf between the attributes we know and the substance we infer, no breach between the effect and its cause which the mind is called on to overleap by an act of faith. No miracle is appealed to in order to account for the naturally inexplicable correspondence of truth and reality. The concept gives us the reality directly in the living experience and does not pose it as a problem of what may lie beneath and beyond. In the second place it gives us a principle which is really interpretative. The science of naturalism has no interpretative principle. It is reduced to descriptions and to hypotheses based on observed sequences, tentatively put forward as laws of nature, and, guided by utility, erected into more or less arbitrary systems. Science prides itself on its pure empirical method. To criticize this method is not to depreciate it but only to point out how limited and narrow its success is, and how useless and indifferent to its progress is the metaphysical principle to which it appeals. The metaphysical principle of creative evolution, on the other hand, anticipates with its interpretation the problems which for common sense and physical science are insoluble. If we accept it there is then no mystery in intersubjective intercourse, in the knowledge of other minds, in the continuity of consciousness —simply insoluble on the empirical principle. There are problems no doubt, but their direction is reversed. Consciousness is no longer a problem because life is the concept of a reality which is conscious in its own right, but unconsciousness is now the problem. How and to what end has unconsciousness been brought about? How does unconsciousness serve the progress of evolution? The task of science is still weighted with problems, but at least it is not rendered *a priori* impossible from the outset.

Let me now try and illustrate the principle itself. Let us suppose we are walking along the cliffs of some rocky coast, and reflecting on the various forms of life which

have adapted themselves to the environment. Any other scene may give rise to similar reflexions, but along the fringe which divides or unites land and ocean we meet with a more striking diversity in the range of living action than anywhere else. Here at our feet or below us within a very narrow range are forms of plant life adapted to most precarious and capricious conditions of wind-swept, water-sprayed rocks. Below in the tidal area are zones of vegetation each conditioned by the exact proportion and variation of the bi-diurnal ebb and flow of the salt water. Here also are zones of animal life determined by the conditions of the plant life or by the degree of the salinity of the water or the range of constant pressure or density. And outside or above these land and water conditions are the ranges of bird activity, the life conditions of gulls, cormorants, terns, with sandpipers, jackdaws, and it may be, if the place is wild, ravens and falcons on the shore or cliffs. The whole is a harmony, in the broad sense of the word, which would include the preying, and also the parasitism, of one species on another, and there is maintained a more or less stable equilibrium. Watch then the behaviour of any of these creatures. Here, for example, are the cormorants sitting motionless on the outer rocks or flying low in a straight line over the sea beyond the rocks exposed at low tide. Why have they no curiosity? Why are they undisturbed and unconcerned when the gulls surrounding them are excited or circling round in noisy flocks? Senseless questions, you say. True, but not from our human standpoint, not if they share with us some degree of conscious awareness of a reality independent of and external to us. They are creatures of high organization, with a perfectly adapted capacity of integrative purposive action. We can only understand their nature at all by supposing some identity between their mentality and our own. Why then are they so entirely lacking in the curiosity which we feel would be potent in us were we placed in their circumstances? They evince no sort of interest in the motives which actuate creatures outwardly resembling them in their activity and inwardly resembling them in the type

of their organization. As we watch those cormorants motionless on their rocks amidst a changing world of infinitely varied interest which by their organization they are capable of entering, but which their nature has inhibited them from entering, holding them fixed to the narrow range of the actions in which alone their interest is vital, it seems to us that they must be circumscribed by their nature itself to the fulfilment of the bare material needs of their existence. The fundamental difference between our own mentality and theirs seems to be the power we have of detaching our minds from utilitarian needs. It seems as though even in the most exalted of creatures in the scale of life below the human, the mind is fixed in attention to the immediate needs of life, and that in man intellect has set the animal free from attention to purely animal needs and transported it into a world of purely speculative interests. Because of this we reason that there must be a world of absolute value and infinite resource over which conscious beings have a certain power of apprehension and accommodating action, and that man possesses this power or has acquired it in a superlative degree.

The theory of creative evolution recognizes an essential difference in kind between instinct and intelligence and a difference in degree in the perfection of each mode of mental activity, but it declares intelligence to be in every respect as much a product of evolution as instinct. It declares that man with all the difference of degree in the range of his activity is yet as narrowly circumscribed and as fixed in his attitude of attention to life as the lowliest living species, animal or plant. Despite the range of our activity, in all that is essential to it, and so far as the evolution of life is concerned, there is absolutely no difference between the case of the cormorant on the rock, indifferent to what does not concern its life, and man. The same evolution, the same direction and purpose of evolution, which has produced the mind of the cormorant has produced the mind of man. We cannot understand intellect if we assume it to be a power of direct discernment and also assume the object of the discernment to exist independently of the

mode. We can only understand our human nature when we realize that the aspect of the world to the mind and the mode of the activity of the mind in the world are not two independent things but one active living process which in its realization creates two factors, necessarily opposed and strictly correlative. Can we doubt this in the case of the cormorant? The aspect of the world to the cormorant is clearly as essential a part of its evolution as the mode of its responsive activity. If not, then how can evolution be appealed to for any interpretation? Evolution can only mean that in some inexplicable way some small degree of conscious awareness arises at certain stages of complex organization and increases with the mechanical, equally inexplicable, growth of the complexity. If awareness be contemplative discernment there is nothing in its concept which restricts it, yet we are to suppose that only in the human intellect is it unrestricted. How far will such a theory take us? How far is it even a credible hypothesis when we face the problem of evolution?

Is there not then, it will be asked, an objective world, or at least some objective basis in reality, common to cormorant and man, and is not the difference in their mentality solely concerned with their relation to this world? If this means what it implies, that something abstracted from the experience of cormorant and man may be identical in the experience of each, then the answer of creative evolution is a distinct and unqualified negative. The nature of the reality of any living individual creature precludes the possibility of dividing its experience into independent self-subsistent factors. What is identical in cormorant and man is not anything abstracted from their experience but the life of which each is the expression. The theory of creative evolution is that there is no difference in the life which is finding complete expression in every individual; the difference is in the form and mode in which it is realized in action. Evolution has created in man the range and sphere of his activity, the mode of the exercise of his activity, and the form which actions take concordantly with range and mode. It has created in the cormorant, concomitantly,

the range of activity, the mode of activity, and the concordant form of action. In each case the objective aspect of reality and the subjective control of reality are the creation of the evolution of life. Compared with one another, man may be on an altogether higher plane than cormorant and may express a more perfect achievement. He may belong to a higher type possessed of greater efficiency, and this higher type and greater efficiency may be directly due to man's intellect, but intellect and the world it apprehends are not independent factors which may be separated from human nature, they are the factors which constitute it and they exist only in and for it. Man is no more free than the cormorant if being free mean being unrestricted to the mode and range of activity which the evolution of human nature has created. Were it possible for man to view this human mode from a non-human standpoint it would doubtless be its narrowness not its breadth, its bondage not its liberty, which would characterize it, just as these are the characters which impress us in the cormorant when from our standpoint we survey its activity.

What then is this world of objective reality which I regard, and by my nature am formed to regard, as existing in itself and independently of my life and particular mode of living activity? It is clear that I apprehend it in two quite distinct ways, first, immediately in my percepts, second, reflectively in my concepts. Let us ignore the whole philosophical problem of knowledge and consider only the nature of this reality apprehended by sense and understanding. It is essentially a spatial and a static reality. Yet the only reality which we actually know intimately, know in the very act of knowing, know in the mental activity we exercise, is essentially a time reality, a flowing or continuous change, the ceaseless moving on in time of something which is not of a spatial nature at all, has no extension, but is a tendency, or striving or direction. The external world which we suppose is revealed to our mind in knowing is therefore, in its nature, in striking contrast and direct opposition to the reality we most certainly know. Yet there is in regard to our knowledge of this external

world one very significant fact. Notwithstanding that its static and spatial character presents itself to us as fundamental, yet the more deeply we study nature the more its static and spatial character dissolves and disappears. In physics, for example, it is now accepted that mass is a function of velocity, and generally that the solidity of objects is never absolute but always relative to the power of the subject to discern and discriminate, it simply marks the *pro tempore* limit of discernment and discrimination. It becomes evident therefore even to common sense and scientific investigation that the aspect of our world is purely relative to our power of influencing it. We view the world as spatial and static because in that way alone are our actions shaped.

The world we apprehend, however,—whether or no its spatial and static characters be its external aspect and not its inherent nature,—is yet apprehended by us, not as continuous, but as discrete. It consists of objects mutually excluding one another. It is difficult to suppose that this division of the world into juxtaposed separate things belongs only to its aspect and is not due to a real articulation inherent in nature. Here again let us ignore the philosophical problem of the association of sense qualities and consider the question purely from its common-sense and scientific aspect. At once we are struck by a significant fact. When we study the behaviour of other forms of conscious activity, of the various species of mammals, birds, reptiles, fish, insects, worms and protozoans, it is quite inconceivable that their objective world can be articulated along the same lines or following the same principle as ours. By what right then do we affirm that ours is absolute and every other relative ? Clearly we have no right. What then determines for them the shapes of objects, the outlines and definitions of separate things, the lines of natural articulation ? Surely it is no other than the actions themselves which the living creatures are severally fitted to perform. Can our case be different ?

Directly we apply this principle a new meaning and a new interpretation of the activities of perception and

memory come to view. Perception is preparatory to action, and memory in conditioning perception serves action. What then are the objects we perceive? Plainly they cannot be things-in-themselves,—such things would have no relation to our actions nor to our activity. The outlines of the objects we perceive are the lines along which we are fitted by our mental constitution to exercise our peculiar influence. Our world is articulated to conform to our mode of activity, and our mode of activity is designed to take form in actions. There are no things, there are only actions, and actions, actual or virtual, take the form of things by reason of the spatializing, fixing, activity of the intellect.

If there be nothing absolute in our objective universe, it follows that the absolute is within us. It is not within, however, in any abstract meaning of the term, any meaning which would isolate the subject of experience from its object. The absolute is the life of which every individual of every species, including and not excluding his world, is the product of creative evolution. There is then a real articulation, there are lines of division which are not aspects. This real articulation is the plurality of the monads. Also there is pre-established harmony of the monads, if we impart to this old term the new meaning. Creative evolution has no need to posit a creator God, because creation is seen to be the essential character of life. By pre-established harmony we do not mean that to an infinite mind all the possibilities of non-existent universes were present in idea, and that the infinite mind, having perfect knowledge and infinite power, brought into existence the best of all possible worlds. To suppose this is simply to create God in the image of his own intellectual creature. We cannot if we would, and no metaphysical need requires that we should, transcend the reality in which we live and move and have our being, the reality of life which is a creative evolution. The harmony is not imposed upon us by the fiat of an intelligent creator, it is the *a priori* synthesis which is the condition of the possibility of experience.

Let me now recapitulate briefly the theory I have

tried to expound in this chapter. Creative evolution is the theory that the subjective modes of living activity, —vegetative, instinctive, intelligent,—and the objective aspects of the sphere of living activity have been created concomitantly by the evolution of life. In particular as applied to human nature the theory is that the human intellect and the material aspect of man's universe are correlative and have been generated *pari passu*. There are two metaphysical assumptions generally accepted by common sense, and in physical science regarded as self-evident. The first is that matter is absolute. Without implying any theory as to its nature and genesis, its existence is held to be independent of life which is conditioned by it and of mind which contemplates it. The second is that the intellect is absolute. Whatever activity the intellect may exercise, it is conceived as *prima facie* a passive contemplation of reality. The world is revealed to it and ideally represented by it in perception. The first assumption is irrational. Even if matter be conceived as uncreated, yet the idea of a progression from simple to complex, from homogeneity to heterogeneity, from the inert to the living, involves the notion of the creation of something from nothing, and this contradicts the principle of sufficient reason to which it appeals. On the other hand, if we posit God as the first cause, the argument is simply circular, for we find nothing in the concept of God except what we have put there in order to account for the existence of matter. If, on the other hand, we argue from the idea of God to his existence, then we destroy the whole force of the reasoning if we separate God from the world, or suppose a creator existing independently of creation. The alternative is to conceive the absolute reality as active life. This is to conceive a God who cannot not exist, a reality in whom we live and move and have our being, affirmed in the thinking which thinks it. This reality is life, conceived not as adjective but as active substance. From life we can deduce matter because matter is a diminution of life. Also matter can take the aspect of a reality independent of life because we can take abstract and partial

views of our activity from the standpoint of the acting centre of activity. Every living individual creature has as counterpart of its subjective mode of behaviour a corresponding objective universe represented in its perceptions. By the relation of these factors actions are determined. Both the mode of subjective activity and the aspect of the objectivity of the universe are created by the evolution of life. In man this subjective mode is the intellect, the objective aspect of the universe, matter. The objects of intelligent activity are spatial and static. Both mode and aspect are generated *pari passu* by creative evolution. The absolute lives; for life is the absolute. The basis of existence is process. Reality to every observer assumes a twofold aspect—activity and action. Spatial objects or separate things are the articulation of reality which is relative to its intellectual apprehension. The real plurality is that of the monads, each the active centre of the one universal principle.

CHAPTER XIV

THE EXPERIMENTAL METHOD

If God gave to things accidental powers detached from their natures, there would be a back door for recalling the occult qualities which no power can understand.—LEIBNIZ.

IT follows from the metaphysical principle expounded in the last chapter that a certain practical character attaches to all knowledge and a certain theoretical character to all action. There is no absolute truth in the sense of propositions which would retain their meaning were every human interest absent from them. There is no independent criterion to which an appeal can be made. Life is reality, to live is to exist, and there is no reality transcending this existence. Monadology is based on this *a priori* impossibility of dissociating mind and universe. In order to see the full import of any theory it is necessary to keep the antithesis clearly in mind, because all affirmation is negation. The strength of the antithetical theory, which dissociates mind and universe, and posits in the object of knowledge independent existence somehow revealed to a contemplating mind, is that it purports to afford an absolute basis for the truth and also a principle for the progressive advance of the sciences. The apparent defect of monadology and the antipathy which it has to encounter is not only that it seems to fail to provide, but that it seems positively to deny, for the sciences, an independent foundation in reality. It declares them to be anthropomorphic in their very nature. The logical problem of monadology is to determine, and if possible justify, the status it assigns to the mathematical, physical and natural sciences.

Philosophy is *scientia scientiarum*, and the philosophical ideal in all ages has been an organon embracing the whole range of human knowledge and exhibiting all departments of special sciences as links in a chain.

We are accustomed to date the modern period of philosophy with the rise and development of inductive science under the experimental method. We owe to this method the peculiar aspect of our modern world. It has brought to mankind a vast expansion of knowledge and has given to knowledge a direction which has tended, and increasingly tends, to change completely the conditions of human life and to widen and strengthen, in growing proportion as it progresses, man's control over the forces of nature. The experimental method had always some expression in scientific inquiry, for it is of the essence of the scientific spirit, but the predominant place of experiment in science and the obviousness of it is entirely a modern thing. It would never have occurred to a Greek philosopher, it is doubtful if it would even have seemed relevant, to make the experiments which Galileo carried out on the leaning tower of Pisa. It is true that Archimedes invented machines and made discoveries which were for a time successfully applied in the defence of Syracuse against the besieging Roman armies, but his inventions were deductions from general principles, and it is doubtful, to say the least, if it ever did or ever could have occurred to him to establish rational principles by simple induction from particular experiments, still less to devise laboratory experiments in the modern manner. Aristotle was one of the greatest naturalists who have ever lived, a careful observer and minute describer of the various forms and functions of vegetable and animal organisms, but it would probably have seemed *a priori* absurd and contradictory to him to suppose that rational principles were to be inferred from observed uniformities and not *vice versa*, viz. that the uniformities were to be interpreted by rationally discovered principles. If we can claim therefore in modern philosophy to have advanced beyond the Greeks, it is not merely in the extent and the range of modern science, but in the method and principle which

have made modern science possible. The experimental method represents an attainment of the human mind, which has raised it to a higher intellectual level, with all that this implies in width of outlook and world-view than that which has ever been reached before. Any philosophical theory which fails to take account of and interpret the significance of this latest, truly amazing, victory of the human intellect stands self-condemned.

It is no doubt the consciousness of this emergence of a new scientific principle and the victory it is assuring to man in his struggle against natural forces, which must be taken to account for the rise and attractiveness of the scientific philosophies, or philosophy of the sciences, of the nineteenth century, in particular, the positive philosophy of Auguste Comte and the synthetic philosophy of Herbert Spencer. The idea underlying both is that in these latter days there has arisen a new method and a new spirit of inquiry, and that humanity is now called upon to cast away the shell of outworn metaphysical systems which had cramped and confined the spirit, and enter with a new life into possession of a new inheritance.

The experimental method never presented itself as a device or invention. Its exponents always claimed for it that it is the natural and obvious way in which knowledge is acquired, retained and accumulated. The simple teaching of nature had been, it was said, overlaid and obscured by superstitions and conventions, which with their growth had acquired vested interests and established a lordship over the human spirit. The one thing needful was to fling off the old man of the sea. The experimental method purported to be nothing but the interrogation of facts without presuppositions, the acceptance of facts at their face value, and the interpretation of them in relation to human interests. This was simply to observe nature. It was not an acquirement or an attainment of the intellect, but the ordinary untrammelled mode of the mind's activity. Now at last, declared the positivists, the bonds are broken and the human spirit is set free.

The positivist theory of three stages in the historical

evolution of human mental activity in relation to objective knowledge,—the theological, the metaphysical, and the positive,—pre-Darwinian, and without reference or relevance to biological evolution, has had a quite extraordinary influence in determining the present intellectual attitude towards science and philosophy. Although its claim to delineate definite historical periods and to pass judgment generally on the history of philosophy was soon modified, it nevertheless gained wide acceptance as a classification and natural history of the mind, and of its progress in the acquirement of knowledge. It fixed on metaphysics an absurd and irrational meaning from the reproach of which it has been slow to recover. According to the theory of positivism, the first impulse and direction of thought, confronted with the phenomena of nature, is to create in imagination supernatural agents, fashioned in the image of man, but endowed with the powers necessary to account for the forces of nature. In time these imagined agents and powers fail to satisfy the conditions of experience and become impossible to harmonize with experience, and then the mind passes naturally to the second stage. This second stage is when the mind duplicates the phenomena of nature with shadowy unsubstantial abstractions posited *ad hoc* as causal explanations, superior to the old theological ideas only in the fact that they are deprived of volition and caprice, the fruitful source of enslaving superstition. As soon as reflexion discovers and exposes the insipidity of this device, the human mind attains the positive stage. Recognizing the reality which is presented to it in experience, the mind now accepts it as self-sufficient in its revelation and proceeds to classify and organize it instead of seeking to delve beneath it.

But to decide to stop short of metaphysical inquiry, whether for utilitarian or any other reason, is not one and identical with disproving metaphysics, discrediting its results and demonstrating its impossibility as a science. Yet this is what positivism claims to do. To assume arbitrarily that in the mathematical and natural sciences we possess knowledge in its objective and absolute meaning, and to denounce all investigations into the basis or ground

of the assumption as prejudiced and vicious, is to adopt an attitude of irrational dogmatism as the only alternative to complete scepticism. It is so because the moment we attempt to justify the assumption as rational we are involved in metaphysics. Is it not then verging on foolishness to pretend we have any power to refrain? What gives to the positivist the appearance of self-sufficiency in the science he appeals to is its amenability to classification and organization. Pure mathematics, which is not an empirical science, seems to supply a body of intuitive, unquestionable truth, and on this absolute basis is raised the whole hierarchy of the empirical sciences, growing in complexity but interrelated and organically subordinated. Above all, the positivist points to the triumphant progress of knowledge which has followed the employment of the experimental method and its practical outcome in the extension of the range of human activity. Against this experimental research, continually increasing the sum total of knowledge, the positivist pictures the speculative philosopher, blindly wandering in the obscurity of metaphysics, ever darkening council and mistaking shadows for substance.

Yet positivism, with all its protesting, has a metaphysics, and a metaphysics which is not simply equated with unknowability. It has a metaphysics of the knowable, of the positive character of the reality which science affirms. How can it be otherwise? Consider the aspect of the world which science presents to us. A spatial universe, infinite in extension, a series of events with an infinite past and future, laws of mass and movement identical at all times and in all places,—this is the knowable universe. Its limitations are not the unknowable but the unknown. Is it not *prima facie* extravagantly improbable that such a knowable universe, assuming it to be objectively independent of our mind and absolute in its existence, should reveal at once its nature and existence to any infinitely insignificant mind willing to contemplate it without prejudice? Yet this amazing assumption is to satisfy the inquiring mind without any support from metaphysical theory. It does not satisfy, and it is impossible that it should, because

it strikes athwart the natural disposition of man's intellect which is framed and fashioned to seek reasons for what it believes.

The study of the history of human intellectual development discloses a very different course of evolution from the imaginary stages of the positive theory, and shows that so far from the experimental method being the original and natural mode of investigation, only obscured by convention and superstition, it is a high and very late attainment. It rests on a new concept of reality, a concept unknown to the Greeks and unknown to the patristic and scholastic philosophy, or at least a concept which never reached expression in their thought. More than this it is a concept which could not have found expression in modern philosophy had we not the Greek and the Christian philosophy as our inheritance.

The concept of nature which underlies the experimental method is the direct opposite of the concept of animism. The animistic concept is that the movements or changes which appear to us in external nature are the actions, or the results of actions, of beings actuated by desire and volition. The phenomena of nature are conceived on the exact analogy of our own actions, which are the outward expression of inner understanding and will. The rational attitude of a creature in a world animistically conceived is propitiatory not cognitive, or cognitive only with a view to propitiation. It is clear that with such a concept experiment as a means of discovering truth is irrational, though it may indeed be a means of obtaining favours. Imagine an animal for whom all nature is its human environment, as it practically is for the domesticated dog, or the sheep, or the canary, whose life and activity depend on human routine actions and dispositions. Suppose such an animal to develop a high degree of intelligence of a form analogous to the human. For such a creature human beings and their dispositions of inert matter are the external world. Any concept of external nature such a creature might acquire must of necessity be animistic ; if it were not, and to the extent that it was not, it would be untrue. It is

difficult to imagine in what way for such a creature any concept not animistic would work, or any meaning in which such concept could be true. But the same animal in the wild state would be in a totally different case. It would be in fact in an analogous condition to man himself, and if it acquired the human mode of intellect it might adopt an animistic concept of its external world, but would not be under a necessity to do so, and if it did it might advance beyond it.

The animistic concept is neither irrational nor non-rational. It is the characteristic, original and universal concept of primitive peoples. Even more striking is its persistence in the highest stages of culture. Consider how anthropomorphic we are in our ordinary experience, despite any degree of scientific discipline, and anthropomorphism is the essence of animism. How impossible it is for us to see the dog looking up into our face and realize its essentially different mentality! How difficult to throw off the notion that the fly which is worrying us with its persistent attentions, and warily avoiding our attempts to capture it, is inspired in its behaviour by suspicion, fear, cunning, and such like incentives!

It is most important, however, to recognize that even in its most extended application the animistic concept is not irrational. Were we not subjects of experience, conscious of our active psychical powers, we should have no knowledge. What surer principle then can we appeal to than that inner experience itself? Moreover, we start our experience, not as minds confronted with an unresponsive world of inert matter, but as helpless members of a responsive community. The really extraordinary step to explain is how we come to recognize a non-living world, how we reach the concept of inert matter, how we have attained to the fundamental concepts on which we have been able to erect the mathematical and physical sciences.

What then is the fundamental concept on which the experimental method depends? It is the concept of an external world the laws of which are definitely and absolutely determined by the nature of its constituents, and whose

constituents are completely independent of any conscious process or order of knowing. More precisely, it is the concept of a material substance and of an efficient causation which are independent of life and consciousness. Without this concept there might be psychical science, there might even be mathematical science, but there could not be physical science. The experimental method is serviceable in physical science just because that science excludes from the concept of physical reality the possibility of caprice.

Mathematics is not experimental in its method in the sense in which physical science is essentially so. A clear illustration of this is afforded in the case of the non-Euclidean geometries. The truth of these is their logical consistency, and their content wholly depends on the choice made of postulates. Their claim on our acceptance depends purely on their convenience in working. But in regard to any one of them or to the Euclidean geometry itself we may raise the question, is it physically true? The question can only be decided by an application of the experimental method, and such an application may or may not be possible. To set about it, the first condition is to determine some natural phenomenon which, on the hypothesis of the truth of the mathematical theory, would undergo in stated circumstances some definite alteration or some distortion in its normal appearance, then to contrive the means of artificially producing these conditions. The concept of reality underlying such a method excludes and rejects absolutely the notion of any choice whatever so far as the physical basis of the science is concerned. In this respect therefore mathematical and physical science are in marked contrast, and mathematics cannot be, as positivism claims, the basis of physical science.

A remarkable instance of the relation of mathematics to physics is afforded by the story of the Eclipse Expedition of May 29, 1919. The expedition was organized with a view to testing the general principle of relativity. So far as pure mathematical science was concerned there was no need of any test of that principle. That principle was methodological and proposed no more than the non-

Euclidean geometries proposed, namely, to choose other postulates than those in ordinary use. Those physicists and mathematicians who rejected it, did so, not on any ground of truth or falsity, but purely on the ground of convenience and expediency, the same ground on which the non-Euclidean geometries are rejected in practice. In one sense there is no meaning in asking whether the principle of relativity is physically true or false, because being a mathematical and not a physical principle all that is necessary is to establish that it is not contradictory. But there is an overpowering bias in the human mind which prevents it resting satisfied with non-contradictory principles and requires it to determine the relation of every principle to actual existence. This is the basis of the experimental method. It brings theory or hypothesis to the test of physical fact. We want to know of everything not merely whether or not it may be so but whether as matter of fact it is so. Einstein in formulating the general principle of relativity, and particularly its application to the laws of gravitation, had suggested an experimental test. He worked out a particular effect and foretold a hitherto unobserved phenomenon. The eclipse of the sun on the one day of the year (May 29) when there are bright stars very near the disc, afforded the opportunity, and the English Expedition carried out the observation. The test was this: the light which reaches us from the fixed stars is assumed to follow a straight line—the stars are fixed in the sense that their relative positions are unaltered throughout the diurnal and annual revolution of the firmament; but we only see the stars at night, and then their light is far removed from any gravitational disturbance such as takes place in the neighbourhood of the sun; Einstein predicted that during the eclipse, when the stars near the sun would be visible, it would be found that they had suffered a definite shift, the amount of which he calculated. What was the meaning of this? It is simply impossible to imagine a curving of the light rays as due to light itself following a devious path. The trajectory of a light signal must be the shortest distance between the point of origin and the

point of observation ; were it not, it would be conceivably possible to see a point of light before the light reached us, and such an idea is a self-contradiction. If then the light from a star is curved in the gravitational field it cannot be because the light is not following the shortest path, but because the space is warped or curved. Einstein's test was therefore a true experimental test of the nature of space whether it is Euclidean or not. The warp in space would reveal itself in the displacement of the star. The prediction was verified, and the result of this single observation was, allowing for doubts as to possible explanations, to establish as physical fact that space cannot be regarded as Euclidean, or that the Euclidean postulates are not universally valid. A more complete illustration of a reversal of theory, amounting practically to a revolution, following on a single application of the experimental method, could hardly be found. What then is the nature, and what is the ground of that complete confidence which we place in it ? Why is one experiment sufficient to establish the fact that when analogous conditions are present an analogous result is to be expected and will surely take effect ?

Let us notice then, in the first place, that the certainty we feel in the application of the experimental method and in the predictions of physical science based upon it is totally different in its nature from the intuitive certainty of mathematics. Experiment deals with concrete fact, with existence, mathematics deals with abstract relations and is indifferent to the existence of the terms. The predictions of science are not like the predictions of mathematics based on perceptions of identity, but on perceptions of analogy. In experience nothing is repeated. What happens in experience is an event, and no event can be identical with another event or in any literal sense a repetition, and yet on the basis of experiment physical science can predict with absolute certainty the character of an event, given the condition of it. The certainty of physical science is not only not based on mathematics as the positivist theory supposed, it is distinguished by its complete contrast to mathematical certainty. Physics is concerned only with

existence. Euclid's propositions are true of any possible universe to which Euclid's postulates apply, whether or not such a universe exists. The same is true of Lobatchewsky's or of Riemann's geometry. Physical science on the other hand depends on sense-given intelligibly-apprehended existence, and this means that physics, whatever its relations to mathematics, is not the consequence of which mathematics is the ground. There is no direct advance from mathematical truth to physical reality. What then is the ground of scientific certainty, a certainty which unlike that of mathematics is never absolute, never rises above a degree of probability, but which also unlike mathematics gives a real satisfaction to the inquiring mind ?

There are two historical answers. One is the answer of the English empirical school, according to which the understanding possesses nothing but what reaches it through the senses. Belief, assurance, confident prediction, are the product of a habit induced by objective association. The other answer is that of the intellectualist *a priori* school, that the categories are frames which the understanding possesses independently of experience, and which therefore determine the form of knowledge in advance of experience. The laws of nature or the uniformities of the objective world are not a revelation to experience but an organization of experience. The problem of modern philosophy has been to decide the issue between these two interpretations. It has taken the form of the relative claims of truths of reason and of matters of fact, to precedence on the ground of primacy.

Experience is not experiment, and the empirical principle in philosophy is not identical with the experimental method in science. Neither learning by experience nor the ability to profit by experience implies or depends in any way on experimenting. Moreover, the experimental method is not and could not have been an empirical discovery. It could not itself have been discovered by experimenting, for it rests on a concept of reality which could not have been learnt from experience. It depends on the concept that objects or things are endowed with a determinate and

inalienable nature of their own. The experimental method is both theoretically meaningless and practically worthless unless what a thing does reveals what a thing is, and not merely what happens to it; and what a thing does can only reveal what it is if the action flow from its nature. This is the concept of the monad, and the monad is the only concept which completely realizes the experimental method. Leibniz has expressed it in the passage from the *Nouveaux Essais* (bk. iv. ch. 3) which I have quoted at the head of this chapter. He states it in the terms of the concept of the relation of the creator to the creation, but the concept itself is clear. If there are no monads the experimental method is irrational.

The classical argument in this case is Hume's sceptical criticism of the concept of cause, or, as he called it, the idea of necessary connexion. This philosophical argument is in reality fatal to physical science,—it cuts away its whole ground. But inasmuch as science has always seemed in some way to be peculiarly dependent on the empirical principle, and its method to be practically identical with the empirical method, there have been many and repeated attempts to show that the idea of cause, like the idea of substance, is one to which science can be and is entirely indifferent. But what in that case becomes of the experimental method? Experiment is quite different from observation of sequences and the formation of expectations based on probabilities. In a scientific experiment repetition is entirely unnecessary for the establishment of fact or truth; if it be repeated it is to test the accuracy of the experiment, not to add cumulative effect to the fact established. It is the essence of the experimental method that one instance is decisive.

It may be objected, perhaps, that although the monadic concept may be implied when the matter of investigation is the behaviour of conscious or even of living beings, or of the actions which are attributed to them, it is quite irrelevant when scientific inquiry is directed to the purely mechanical actions and reactions of the spatio-temporal material world. To introduce the monadic principle here,

it may be said, would be a simple return from naturalism or positivism to animism. This would be true were the intention to personify or to consider as individual monads, all the perceptions of physical things, or all sensible qualities of things, or pure sensibilia, apprehended by the mind in its perceptions. But these, as we have seen, are not monads for they are not things-in-themselves. The monadic theory is that anything which is a thing-in-itself is a monad. Only in the meaning that it is a subject of activity with its own point of view can a thing be real, and only when so conceived is it a monad. So that whatever is real in the universe is referred to the monads, for they are the only reals. In order then to see how the experimental method depends for its rationality on such a concept let us consider it in its relation to the alternative theory, which we will call atomism.

Take the latest theory of the atom, and let us agree to regard the atomic theory as in no sense hypothetical but as demonstrably actual. The atoms then are the forms which reality assumes in its basal and most elementary constitution. The atom itself as we deal with it is not simple, but we suppose it resolvable ultimately into what is the limit of simplicity, the unit charge of electricity. Let us accept this without raising the obvious difficulty that a unit of charge of electricity, if it be positive, can only exist so long as a negative charge is opposed to it, and that therefore in positing a unit charge of positive electricity we are positing also a negative. Now the whole rationale of experimenting lies in its test character. We use experiment as the crucial criterion which is infallible. We do not use experiment for the purpose of calculating probabilities. If all that an experiment could prove were that what repeatedly or unfailingly has been found to occur under certain circumstances will probably occur again under like circumstances, it would be absolutely otiose. On the contrary, the ground of the experimental method is the certainty that what has happened once if rightly interpreted reveals the absolute character of the real. If it enables me henceforward to foretell what will happen, it is not because it has established a probability, but because it has given

me knowledge of a real nature. Apply this then to our case in point. We are to assume that the ultimate reality of nature is the unit electric charge ; how in such case are we to rationalize the experimental method ? Whatever result in any case flows from our experiment will not flow from the nature of this unit electric charge, for by the hypothesis it is what it is, it will flow from something adventitious to that nature. By the very concept of reality we are prevented from appealing to it for any character or nature it exhibits ; all its properties and qualities must flow from something which in itself it does not contain. Do we demur, do we deny this indifference of the reality to quality, do we affirm that all the properties and character of nature flow from the unit electric charge ? Then we find that instead of conceiving as we supposed something absolutely simple and really elementary, the limit of inertia, we are conceiving something active, self-centred and all comprehensive, we are conceiving not the atom but its opposite, the monad. There is no rationality in the experimental method unless the reality of the universe be monadic.

CHAPTER XV

THE PRINCIPLE OF RELATIVITY

Entia non sunt multiplicanda praeter necessitatem.—*Occam's Razor.*

THE recognition that the experimental method implies the concept of reality as monadic finds expression in the principle of relativity. The purpose of this concluding chapter is to make this clear. The principle of relativity is the direct result of a discovery due to experiment. The actual discovery was simple enough although it was negative and to the conductors of the experiment disconcerting. It was that whereas in the case of all ordinary velocities we are able to compound them, and the results of the composition accord completely with the mathematical calculations and physical deductions, in the case of the velocity of the propagation of light we are unable to introduce it into any composition, it remains constant under all circumstances and for all observers. Our failure to discover any variation due to our own velocity of relative translation is complete. For example, I may know precisely the movement of a system, say the earth, relatively to another system, say the sun ; I may construct an instrument fixed in regard to the earth, moving in regard to the sun, accurately designed to register that velocity ; I then compare the velocity of a light beam emitted from my moving system, and reflected to a mirror also fixed to my moving system, and in whatever direction I turn the mirror I find no difference, the interferometer registers one and the same constant velocity, showing that there is no composition of the two velocities. What is significant in this is not the fact but the interpretation. According to

the principle of relativity it is absolutely simple, but the principle of relativity itself is revolutionary so far as the methodology of science is concerned. First, then, let us ask what is the simple explanation ?

In my ordinary experience I am able to compound velocities, and I am continually doing so. What is the condition which enables me to do so ? I do it without invoking any aid from my individual experience of muscular effort in moving. Thus when I run down a moving staircase I expend no more muscular energy than when I run down a fixed staircase, but I find no difficulty in conceiving and appreciating the increased velocity in the first case when compared with the second, and this velocity is just the sum of the two velocities, mine and that of the staircase, in relation to the system in regard to which one staircase is fixed the other moving. Now in this case and in all such cases—railway trains, passenger boats, aeroplanes, even guns and engines which use high explosives—the composition of velocities depends for its condition upon reference to a system at rest. And for the purpose of any composition some system must be absolutely at rest so far as the velocities compounded are concerned. Not only must there exist such a system but we must be able to utilize it, to refer our velocities to it, otherwise we are helpless. Suppose when on the moving staircase I had no fixed system to refer to, I could not compound the velocity of my own muscular exerted movement with the movement of the staircase, the condition would be absent and no experience could supply it. I may arbitrarily consider any moving system at rest, but so long as I do so I cannot compound my velocity with any velocity it may have relatively to some other system. If I would do so for anything like a moving staircase or train I must have the earth at rest for my reference. If I wish to consider the earth's movement and compound that, I can do so by speaking fancifully of a translation of 5000 miles a minute through space, but then I take the sun to be at rest. If I am still unsatisfied and wish to compound the movement of the solar system itself, I must take the stars or at least

the stellar system as at rest. There seems no limit, and in nature so far as we can see there is none, but there is a practical limit. It is only theoretically, for example, that I can compound the velocity of my own muscularly induced movements with the velocity of the earth's translation, and when I do so in theory I have no possible means of using the result I obtain. It is different with regard to all the velocities which refer to the earth as at rest, for I am so constituted that this earth is my *terra firma* for all the purposes of practical life. I am able by making use of it to compound all the velocities in which I take part. To compound velocities, therefore, it is not sufficient to *assume* some system at rest, it is absolutely necessary as a condition of the compounding that there should *be* a system at rest, and the earth *is* this system for human observation. Now precisely the reason why we cannot compound the velocity of light with velocities of translation is that for light there is no system at rest, nothing absolute to which we can refer it, no background against which we can observe it. And it is not the slightest use to assume one, because we cannot make practical use of any assumption. Newton thought he could compound velocities by assuming absolute space and time. It was an illusion. Even in his own case the assumption was useless and his absolute space and time did not and could not enter as factors into his own equations of relative movement. It is quite simple, therefore, to see what is the fact in the case of the constancy of the velocity of light. We seem to think we have in space and time (or in a hypothetical ether if we hold that theory) an absolute system at rest, but it is a useless assumption for the purpose, because at most it is no more than an ideal background for thought, it stands for nothing in nature which we can make practical use of as we do of the earth. Consequently what happens is just what would happen in the case of terrestrial velocities if we had not the earth at rest for our system of reference,—the velocity remains constant, and the space and time units, whose ratio is the velocity, automatically accommodate themselves.

Let me give as an illustration a terrestrial velocity

which must be automatically accommodated in this way. The people who inhabit Tibet or the plateau of Chili clearly have a longer day than those of us who live at or near the sea-level. The day is not longer at the expense of the night or the night at the expense of the day, the whole twenty-four hours of the day is a longer period than the twenty-four hours of the sea-level day. For a day is the revolution of the earth on its axis, and the circle of revolution in Chili or Tibet is outside the circle, and therefore a larger circle than that at sea-level. If those circles are divided into spatial and temporal units, those units must be different either in size or in number. If our clocks registered millionths of a second we should detect the difference at once. For example, take the difference to be equal to ten miles of the circumference of the circle, then if the circles were divided and the divisions measured by the swing of a pendulum through half an inch, there would be a difference of more than a million and a quarter swings of the pendulum between the two. It is clear, however, that the inhabitants of Chili and Tibet are unaware of, or indifferent to, their advantage, if it be an advantage, and it would probably be so if it were multiplied a million times, but why? Because human lives are so contrived, or evolution has so brought it about, that such differences are automatically compensated. Why must they be automatically compensated? Because we have no absolute and utilizable system of reference. Things, therefore, which for human beings are one and identical, or only numerically different, may be totally different for non-human observers.

Before we leave this question one remark is important in regard to what is known as the hypothesis of the ether. It is only because it was thought that this hypothetical medium or stuff could be utilized as the required system of reference for the compounding of the velocity of light that the principle of relativity has rejected it. In so far as the ether is the necessary counterpart of the undulatory theory of light, it is unaffected by the discovery that the velocity of light is constant. We have no absolute framework of reference, and ether therefore, if we assume it to

exist, performs no function and affords no independent support to physical theory outside that function for which it is postulated.

The work of Einstein has been to turn the principle of relativity to general scientific account. This meant the abandonment of any independent objective absolute as the basis of physical science. It was at once seen to involve much more than this. It implied the change to a monadic concept of reality, a concept which had been treated hitherto, not only by the scientific world but also by philosophers, as the antithesis of a scientific concept. Einstein is a philosopher in spite of himself, and like Molière's *Médecin malgré lui*, the consternation he has spread in the realms of philosophy may be fitly compared to the havoc the wood-cutter caused in the orthodox medical circles.

Let us see then what is the effect of the adoption of the new principle and of its extension as a principle of interpretation beyond the special case for which it had to be invoked, in order to include all the laws of nature.

The principle is : Every law of nature, in so far as it is a quantitative measurement and expressed in mathematical equations, is measurable by co-ordinates chosen for a system or frame of reference to which the observer is attached and which consequently for him is a system at rest. The laws of nature are the same for all observers in all systems moving relatively to one another because all observers use the co-ordinates of their own system.

There is no system of reference which is at rest absolutely in relation to systems of reference which are moving absolutely.

A system of reference is not a thing-in-itself ; it is a system of reference only for the observer who co-ordinates the universe from it.

The continuity of the laws of nature does not depend on the systems of reference and their unchangeableness relatively to one another, but on the automatic adaptations of the axes of co-ordination of the observers which compensate the changes in or of systems of reference.

The universality of the laws of nature does not depend

on the objective existence of the system of reference but on the common source and uniform aims of the activity of self-centred subjects of experience.

Mathematical formulae and quantitative equations refer to ratios and not to invariable units of dimensions: they are meaningless when posited of a system of reference assumed to be independent of an observer's co-ordination.

Physical science implies an active subject co-ordinating an external world, and the norm or standard of dimensions of that world is relative to the system of reference which for that subject is at rest.

Knowledge is selection, but there is no unselected matrix and no unselecting subject, save as limiting concepts. Neither mind in itself nor nature in itself is a system of reference. Mind and nature are essentially distinct but existentially one.

Activity simple and indivisible in its being and multiple in its expression is the fundamental concept of reality. Its simplicity and unity as mind, its variety and diversity as nature, are seen from within, not surveyed from without. There is no without.

The adoption of the principle of relativity means, therefore, that the subjective factor, inseparable from knowledge in the very concept of it, must enter positively into physical science. There is no mathematical equation and no scientific concept which can claim to be even abstractly true when the subjective factor is suppressed. I will now illustrate the consequences which follow from this in physics, in mathematics and in philosophy.

Let us start with physics and consider from this standpoint the nature of the fact which has proved so disconcerting from the old standpoint,—the impossibility of compounding the velocity of light with experienced velocities. For the system of reference which human nature has selected, light has zero velocity. We are accustomed to say that the velocity of light is comparatively to terrestrial velocities so enormous that for human beings in their ordinary experience it is inappreciable. We put it in that

way simply because we happen to have learnt by astronomical observations and calculations, and reasoning thereon, that there is a velocity of light which can be definitely and accurately expressed in terms of miles and seconds, and with such precision that we can know it to be 186,330 miles to the second *in vacuo* with a margin of error not exceeding thirty miles a second. But this is a calculated velocity, not a perceived velocity. The fact is that for a normal human experience there can be no velocity of light, or if we say that there is a velocity, then though theoretically it exists, yet for human perceptual experience it is zero. It is easy to recognize this if we consider that were there a race of abnormal human beings who were sightless, yet responsive to other influences than light, then for them some other propagated influence, say sound, would necessarily have zero velocity. The discovery that light has a velocity, originally an interpretation of the discrepancies in the calculations of the eclipses of Jupiter's moons, has brought a vast extension of knowledge and given us a new unit for calculating the stellar distances. But while theoretically the knowledge of this velocity is of prime importance, practically it leaves us where we were. It is not a new fact of experience which can be made to take its place within the co-ordination of our human world, simply because we have not, and in the nature of the case cannot have, any means of introducing into our system of reference a background against which that velocity can be manifested and which would act as a standard for comparing it or compounding it with other velocities. Take an actual instance of the application of this knowledge and of its inappreciability in experience. Betelgeux, the bright star in the constellation Orion, is discovered by astronomical observations and calculations to be 160 light years distant from us and to have a mass some 800 diameters greater than that of our sun. Every twenty-four hours that star completes a revolution of the firmament. If then we calculate the mileage of that orbit (it is simply a sum in arithmetic), we find that relatively to us that spot of light we name the star must be moving in the firmament at a velocity some hundreds of

thousands of times greater than the velocity of light. And this is not a very distant star, there are some for which the velocity relatively to us must be million times greater. It may perhaps be objected that this velocity is not a real velocity because it is the earth and not the star which is moving. True, but that is the significant thing. The star ought to have this apparent velocity and yet it has not,—why not ? Because it is merely a calculated orbit, and our system has no means of communicating with the source of light independently of the light, nothing which could inform us, before the light signal appears, that the signal has set out and may be expected, in the way that the lightning informs us that the thunder peal is on its way. There is nothing in the velocity of light which makes it in itself different from any other velocity. Its constancy and our inability to compound it with other velocities is due to the purely negative fact that our system of reference, the selected and organized range of our human world, has no background against which the velocity of light can stand out and challenge comparison. The result is that its known velocity is a theoretical reality which appears as though it ought to, and yet possesses no means by which it can, be brought into accord with our experience. The principle of relativity enables us at once to put it right but at the sacrifice of apparent simplicity.

Let us now take an illustration of the application of the principle in mathematics. When we ask ourselves what is a straight line, we construct in imagination the interval or distance between two points. It seems to us perfectly obvious that in the case of any two selected points, the distance or shortest line between them, whatever difficulties it may offer to any one who would construct it by drawing it, and independently of whether any one has ever succeeded in doing so even in imagination, exists theoretically. This existence appears to us so self-evident that we take its definition, the shortest line, as an axiom or postulate and found thereon the science of geometry. But what does this imply ? It implies that for us there exists a system in which between any two points there is one and only one

straight line, and that this is the shortest line that can be drawn in that system between these points. But is there an absolute system, a real extension or space, in which a particular straight line is absolutely the shortest distance for any and every system? We have always supposed so, practically from the beginning of mathematical science. We have conceived this absolute system by the apparently easy device of supposing emptiness, real and immobile, as the necessary background of all movement, and we have conceived geometry to be the science of this emptiness. Then, possessing this concept, although the straight lines we actually construct are constructed in and for a system moving in space, and not for the space in which the system moves, it seems that it must be with this absolute space that the geometry is concerned. Our straight lines are not distorted for our system, but when their properties are to be demonstrated they are referred to the absolute system, and this seems perfectly easy to do. But modern mathematics has awakened to the theoretical inconceivability of absolute space and to its practical unworkability, and the principle of relativity has come to its rescue. It substitutes for a logical definition based on a metaphysical concept a purely empirical fact. Instead of starting with a straight line as the shortest between two points in a hypothetical immobile medium, it starts with the law of inertia, the universal principle that whatever moves moves in a straight line. It takes its definition from the movement of a particle and not from the logical deduction of a concept. A body free to move and moving freely takes the shortest path, and this is the straight line, but the straight line for one system of reference moving relatively to another system is not the shortest line for an observer in that other system. Thus from two facts of experience, (1) that every freely moving particle takes the shortest path, and (2) that all observation of movement is from systems moving relatively to one another, we get a new basis for a science of geometry. From our terrestrial system, for example, the moon moves through space in a complicated spiral, but the moon is moving in the shortest path, and there is a system, let us

call it the lunar system, for which the moon's path would appear, as well as be, as direct as is to us the path of a beam of light.

Let us now turn from the scientific to the philosophic aspect of the problem. In choosing as an illustration a purely philosophical controversy,—the question of freedom and determinism,—we are dealing with what is still the crucial issue, the supreme and culminating interest, in philosophy to-day. How are we to conceive freedom? How are we to reconcile the essential contingency of mind with the essential determinism of nature? How are we to conceive existence which in its nature and origin is activity, and therefore freedom, and in its development is necessity? When we pass in review the work of the leaders in the modern philosophical movement, we can easily recognize beneath their special problems and particular interests this fundamental problem. Let us see how under the influence of the scientific development this problem of freedom has been transformed.

Every one has heard of, even if unfamiliar with, the great controversy concerning the freedom of the will which for more than two centuries following the Lutheran Reformation divided theologians and philosophers into hostile camps of determinists and libertarians. The determinists (Calvinists, Jansenists, Port Royalists) certainly seemed from the first to have the best of the logical argument, for they pinned their opponents the libertarians (Arminians, Molinists) to a position which they named the liberty of indifference, and which it was easy to show involved them in logical self-contradiction and absurdity. Their argument was that if the will is free it must mean that it does not obey any motive, that it must in fact preserve a perfect indifference in regard to the motives which would seem to determine its choice of alternatives, and that in the last resource it must be purely arbitrary. For,—so the argument ran,—we are able in every volitional act to distinguish the will which has chosen that action and the motive, end, or purpose, of the action it has chosen to accomplish. Moreover, a volition always implies that a choice has been

exercised between alternatives each at least apparently possible. Either, therefore, the choice is imposed on the will by the motive, and then it is the strongest motive which determines the will, or it is imposed on the motive by the will, which, indifferent to motives, makes its motive by arbitrarily choosing it. Hence the two sides found themselves contending not about freedom at all, but about moral responsibility; for if the will is free there can be no moral principle, if it is determined no moral responsibility.

In philosophy to-day this controversy is completely superseded. We are able to see what it was impossible then to conceive, that the problem was insoluble because it was propounded in abstract terms. In so positing it, philosophers were simply following the natural bent of the intellect, which only understands by analysing, abstracting and fixing its terms. There seemed no escape. The abstract concepts were forced on thought by logical analysis. Because all willed actions are motived, and as the will is one and identical while the motives are many and diverse, so it seemed impossible not to regard the will as a thing, existing apart from and independently of the motives, and motives as being what they are and self-identical whether or not they are willed. Either then, it seemed natural to argue, the will acts in accordance with what proves to be, and is shown by the action itself to have been, the strongest motive, and in that case to speak of freedom is absurd. Freedom can be no more than an appearance due to our ignorance before the event of what will prove to be the determining motive. Or else, the will is entirely indifferent to the motives and able to act without regard to what may appear to be their strength or weakness, and then its freedom is a despotic, anarchic, irresponsible lawlessness. Equally absurd in its abstractness was the determinist view, for the motive fixed as an abstraction was no longer a motive, it became indistinguishable from the laws of nature which govern the movements of material things.

The old problem of the freedom of the will has lost its

meaning. Modern philosophy has its problem of freedom, but a problem completely transformed. Freedom is still for us the characteristic of mind in its opposition to nature, but we are delivered from a hopeless antinomy because we are no longer compelled to conceive mind in its abstractness as independent of nature or nature in its abstractness as independent of mind. Our problem is to conceive the concrete. Mind and nature for us exist only in their indissoluble unity.

The new scientific revolution has made it possible to reconcile the concept of the freedom of mind with the necessity of nature. For the principle of relativity is in effect the insistence that reality shall not be taken as an abstract mind or an abstract nature but as the concrete integration in which they are correlative terms. Hitherto the scientific problem has been to find a place for mind in the objective system of nature, and the philosophic problem to validate the obstinate objectivity of nature, seeing that nature can only affect the mind in the shadowy dream-like form of the idea. Now when reality is taken in the concrete, as the general principle of relativity requires us to take it, we do not separate the observer from what he observes, the mind from its object, the agent from his activity, the subject from the object, and then dispute as to the primacy of the one over the other. There are for the new principle no clocks which purport to measure time in itself, we must always know whose time we are measuring. There are no standard footrules by which to measure length, breadth and thickness of empty space, we must always know whose space we are measuring. This can only mean one thing. We must think the reality in which we are active centres of experience and in which we are able to represent infinite actual and possible centres of experience under the category of freedom. To suppose an ultimate necessity controlling our activity, behind us or above us (us, not as empirical individuals, but as universal concrete mind), as Homer represented Fate as the power behind Zeus, is to destroy the concept in the very act of conceiving it. The freedom of the original activity is not confronted with the iron necessity of nature, humbly

entreating that some place be assigned to it, if only as the epiphenomenon, which the old scientific materialism reluctantly conceded. It is freedom in the pure scientific meaning of a character inherent in the nature of reality. The new science cannot conceive reality except as activity. Original activity is dependent on the concept of freedom. This freedom itself creates necessity in every mode by which activity expresses itself. Freedom characterizes the act, necessity the fact. It is the act which produces the fact and not *vice versa*. The freedom, therefore, which hitherto has seemed the special privilege of self-conscious minds, imagined as somehow rising in rebellion against the necessity of an inexorable nature which has produced them, and from which they seem to emerge as an apparition, is in very truth the fundamental character of the reality which has produced nature. We have attained the concept of it in its concreteness, not as the empirical mind which may be yours or mine but as the universal activity.

And now it may be said, what use is this as a working scientific principle? It may be sound as philosophy, it may be consoling as religion, but will it advance science? The scientific revolution is the reply. Its dethronement of materialism, its affirmation of mind and mind's selective activity, its principles of co-ordination, and its systems of reference, prove that science no more than philosophy can progress unless its working concepts are concrete. The material atom has failed by reason of the abstractness of its concept. Science is turning, unconsciously it may be but surely, to the concept of the monad.

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